

**U.S.T.**<sup>®</sup>

MEDACTA UNIVERSAL SCREW TECHNOLOGY

ULTIMATE VERSATILITY IN ONE SYSTEM



## Surgical Technique

Joint

**Spine**

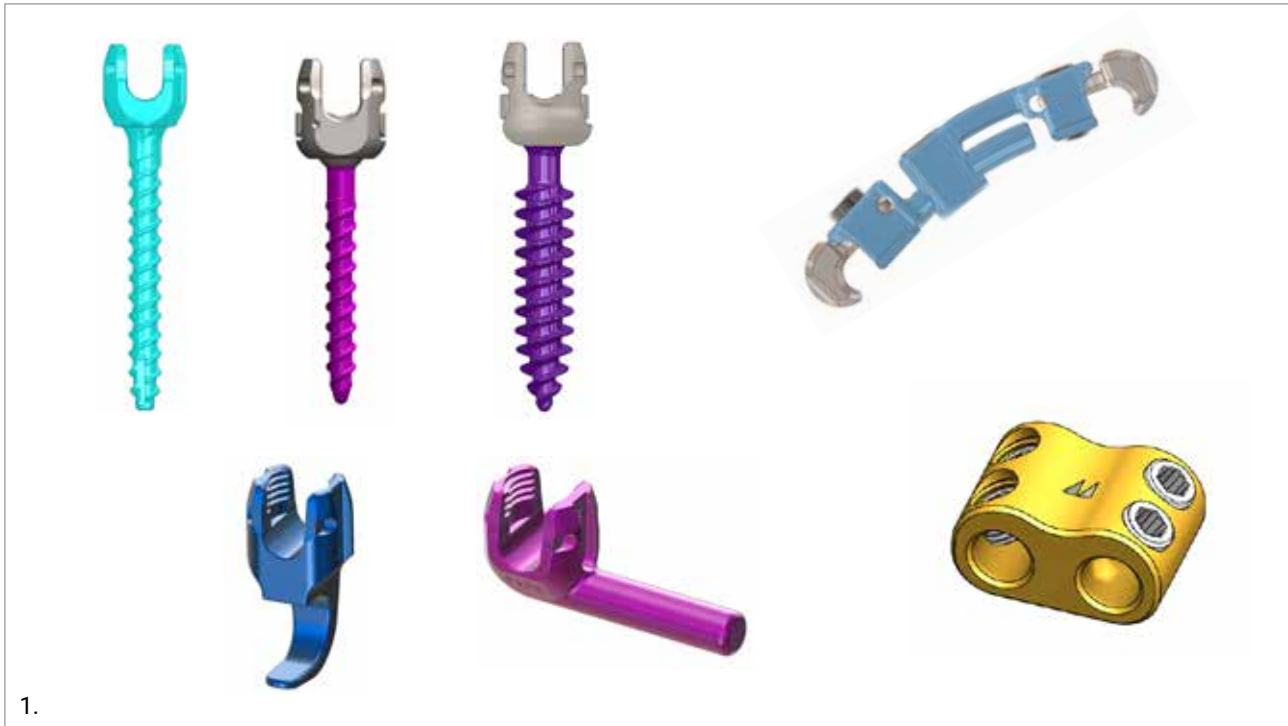
Sports Med



## INDEX

<b>1. INTRODUCTION</b>	<b>4</b>
1.1 Indications	5
1.2 Contraindications	5
1.3 Pre-operative planning	5
1.4 Surgical approach	5
<b>2. PEDICLE PREPARATION</b>	<b>6</b>
<b>3. POLYAXIAL SCREW INSERTION</b>	<b>8</b>
3.1 Polyaxial screw fixation	8
3.2 Head adjusting	9
<b>4. ROD CONTOURING AND INSERTION</b>	<b>10</b>
<b>5. ROD REDUCTION TECHNIQUES</b>	<b>10</b>
5.1 Reduction with rod fork	10
5.2 Reduction with 1-step reducer	11
5.3 Reduction with 2-steps reducer	12
5.4 Reduction with the locking tower	13
5.5 Reduction with the short reducer	13
<b>6. COMPRESSION OR DISTRACTION</b>	<b>15</b>
6.1 Theory and applications	15
6.2 Distraction	15
6.3 Compression	16
<b>7. IN SITU BENDING</b>	<b>16</b>
<b>8. TIGHTENING</b>	<b>17</b>
8.1 Temporary set screw tightening	17
8.2 Final set screw tightening	17
<b>9. CROSS CONNECTOR</b>	<b>18</b>
9.1 Rod caliper	20
<b>10. HOOKS</b>	<b>21</b>
10.1 Pedicle hook placement	21
10.2 Hook placement in the lamina/ transverse process	22
<b>11. LATERAL CONNECTORS</b>	<b>24</b>
<b>12. ROD-TO-ROD CONNECTORS</b>	<b>25</b>
12.1 Rod-to-rod connectors positioning	25
<b>13. IMPLANTS NOMENCLATURE</b>	<b>26</b>
13.1 Sterile single package	26

## 1. INTRODUCTION



The Medacta Universal Screw Technology [M.U.S.T.] Pedicle Screw System has been designed to give the surgeon ultimate flexibility in terms of choice of ideal bone anchor position, coupled with its unrivalled instrument handling capabilities that assist in spinal reduction, stabilisation and ultimately fixation.

The M.U.S.T. system consists of a comprehensive range of devices to fully assist surgeons in the posterior spinal fixation.

The M.U.S.T. Polyaxial Pedicle screw features a range of motion of greater than 60°, which coupled with dedicated instruments, allow the surgeon to achieve independent polyaxial tulip locking, allowing for easy parallel compression and distraction.

These screws are available in a solid and a cannulated configuration giving the surgeons the chance to use them in standard open- as well as mini-open/MIS surgeries. Furthermore, the broad range in size of the M.U.S.T. screws allows to cover primary as well as revision surgeries, completing the scenarios of application in the posterior spine pathology treatment.

The M.U.S.T. Link family (cross connectors) provides an easy-to-use intraoperative option when increased construct rigidity and enhanced rotational stability is desired.

M.U.S.T. Pedicle Hooks provide stability to the posterior elements of the spine in different pathologies spanning from tumors, degenerative and deformity cases.

Finally, the Lateral Connectors are available to improve the stabilization of the lumbo-sacral as well as the sacro-iliac junctions with specific emphasis in the deformities.

## 1.1 INDICATIONS

The M.U.S.T. Pedicle Screw System is intended for posterior non-cervical pedicle fixation (T1-S2/ilium) or anterolateral fixation (T8-L5). These devices are indicated as an adjunct to fusion for all of the following indications: degenerative disc disease (defined as back pain of discogenic origin with degeneration of the disc confirmed by history and radiographic studies); spondylolisthesis; trauma (i.e., fracture or dislocation); spinal stenosis; curvatures (i.e., scoliosis, kyphosis, and/or lordosis); tumor; pseudoarthrosis and failed previous fusion in skeletally mature patients.

When used for posterior non-cervical pedicle screw fixation in pediatric patients, the M.U.S.T. implants are indicated as an adjunct to fusion to treat adolescent idiopathic scoliosis. The system is intended to be used with autograft and/or allograft. Pediatric applications are limited to a posterior approach.

## 1.2 CONTRAINDICATIONS

The use of the M.U.S.T. Pedicle Screw System is contraindicated in the following cases:

- Active infectious process or significant risk of infection (immunocompromised hosts).
- Signs of local inflammation.
- Fever or leukocytosis.
- Morbid obesity.
- Mental illness.
- Grossly distorted anatomy caused by congenital abnormalities.
- Any other medical or surgical condition which would preclude the potential benefit of spinal implant surgery, such as the presence of congenital abnormalities, elevation of sedimentation rate unexplained by other diseases, elevation of white blood count (WBC), or a marked left shift in the WBC differential count.
- Suspected or documented metal allergy or intolerance.
- Any case not needing a bone graft and fusion.
- Any case where the implant components selected for use would be too large or too small to achieve a successful result.
- Any patient having inadequate tissue coverage over the operative site or inadequate bone stock or quality.
- Any patient in which implant utilization would interfere with anatomical structures or expected physiological performance.
- Any patient unwilling to follow postoperative instructions.
- Any case not described in the indications.

Although not absolutely contraindicated, conditions to be considered as potential factors for not using this device include severe bone resorption, osteomalacia, and severe osteoporosis.

## 1.3 PRE-OPERATIVE PLANNING

The review of MRI and/or CT based imaging to template and determine the type/size of the implants to be used to match the patient's anatomy is a critical step in the pre-operative planning before each surgery.

## 1.4 SURGICAL APPROACH

The M.U.S.T. Pedicle Screw System is designed with the focus on spinal fixation. The choice of the surgical approach is at the discretion of the surgeon.

The different Posterior approaches are Midline, Wiltse, Mini-Open as well as Percutaneous.

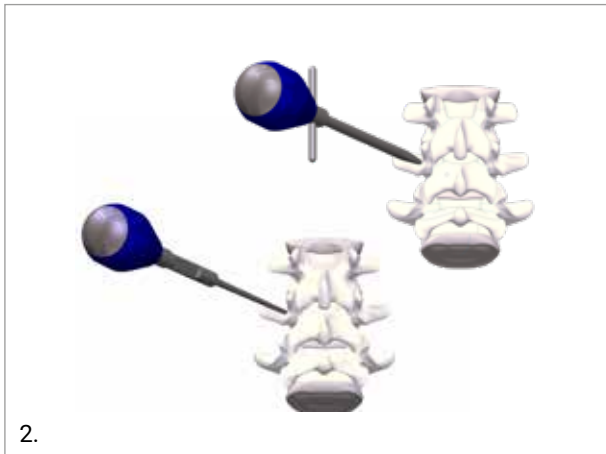
The different Anterior/Lateral approaches are Laparoscopic, Open or Mini-Open. Surgeons would use the retroperitoneal or the trans-psoas technique.

The construct is assembled in the same way as the posterior approach, the screws however are placed directly in the vertebrae, instead of the pedicles.

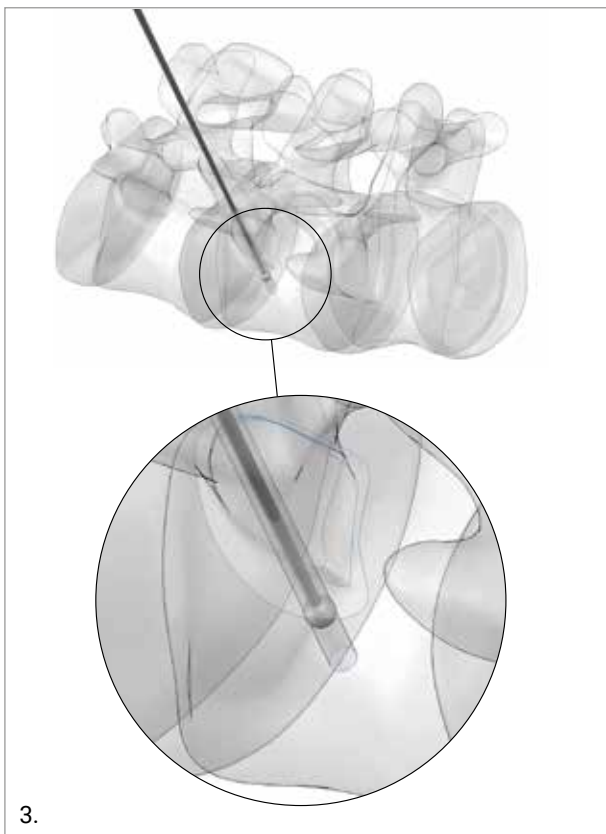
## 2. PEDICLE PREPARATION

Locate the pedicles and perforate the outer cortex with the Pedicle Awl.

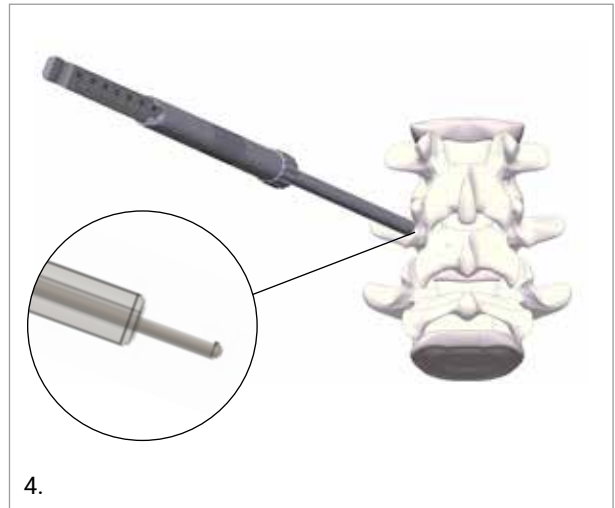
Use the Pedicle Probe to open the pedicle canal. The 10mm incremental markings on the probe shaft provide an initial visual indication of the pedicle canal depth.



Use the Ball Tip Feeler to check the medial, lateral, superior, inferior and ventral walls of the pedicle for possible violation.



A Depth Gauge is available to check the canal depth and to help determining the length of the pedicle screw.



The M.U.S.T. bone screws are self-tapping. A variety of Taps of different diameters are available and may be utilized at the discretion of the surgeon. To tap the pedicle, use the selected Tap with the Quick Connector Ratcheting T-Handle.

### **WARNING**

Before inserting pedicle screws larger than 7mm in diameter, it is mandatory to tap the pedicles. In case of sclerotic bone or any other reason that can cause high resistance during screw insertion apply the same procedure for all the other diameters. Please note that the taps are 0.5mm undersized.



## OPTION

### Modular taps

Modular taps with low profile head may be utilized at the discretion of the surgeon. To tap the pedicle, select the appropriate modular tap and engage it with the driver.

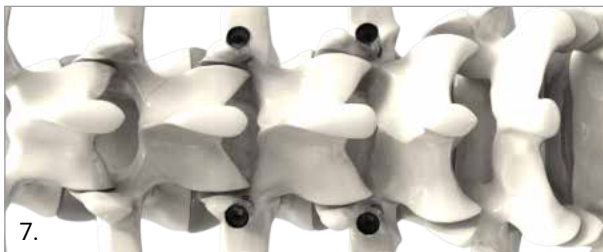
For a secure connection, after snapping the tap onto the driver (Fig. 6A), turn the blue wheel clockwise (Fig. 6B)



### NOTE:

The modular tap nominal diameter is aligned with the final implant diameter. Cannulated taps are available, and can be used following guidewire placement, upon surgeon preference.

After positioning the tap, turn the blue wheel counterclockwise and pull out the driver to release the tap.



With the modular taps in position, the system provides the possibility to perform the distraction manoeuvre through the dedicated distractor.

To mount the distractor:

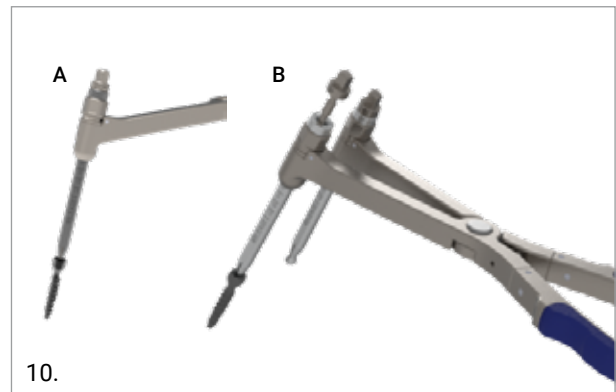
1. Screw the appropriate arm (2 options are available, short and long, depending on the depth of the entry point) into the distractor holes



2. Insert the Lock Pin into the arm and turn it for two rotations.



To connect the distractor to the tap snap the spherical head of the arm onto the modular tap recess (Fig. 10A) and tighten the Lock Pin (Fig. 10B).



When all the taps are safely locked perform the distraction manoeuvre.

### NOTE:

For a more effective action use a second distractor contralateral. The distractor has a retention mechanism. To release it press the distal button.

To release the distractor untighten the Lock Pin and pull out the retractor. The modular tap must be removed using the dedicated driver.



### 3. POLYAXIAL SCREW INSERTION

#### 3.1 POLYAXIAL SCREW FIXATION

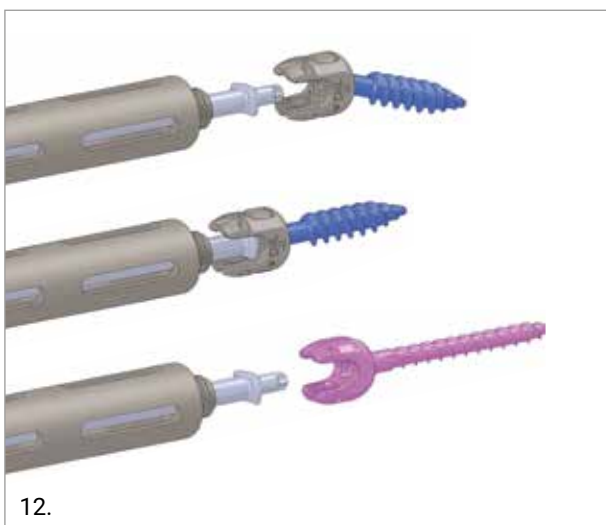
After the pedicle canal has been prepared and possibly tapped, the surgeon can plan for the M.U.S.T. screw insertion. The size of the screw to implant depends on the diameter and the length of the prepared pedicle canal, in relation to the vertebral anatomy. The M.U.S.T. screws can be inserted and fixed with the Polyaxial Pedicle Screwdriver specifically designed to easily align the screw in order to avoid toggling. The blue central handle of the screwdriver is free to rotate, and allows the surgeon to achieve a stable grip on the screwdriver with the non-dominant hand, while inserting the screw with the dominant hand.



Start with attaching the Polyaxial Pedicle Screwdriver to the specific handle.

A Spherical, Straight or T-shaped Quick Connecting Ratcheting Handle is available in our instrument range to give the surgeon a broad range of choice.

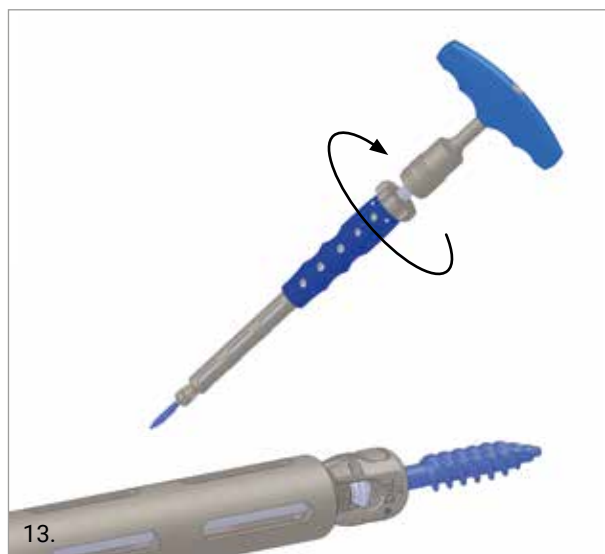
Insert the screwdriver tip into the screw head, locking it in the correct alignment as indicated in the figures here below.



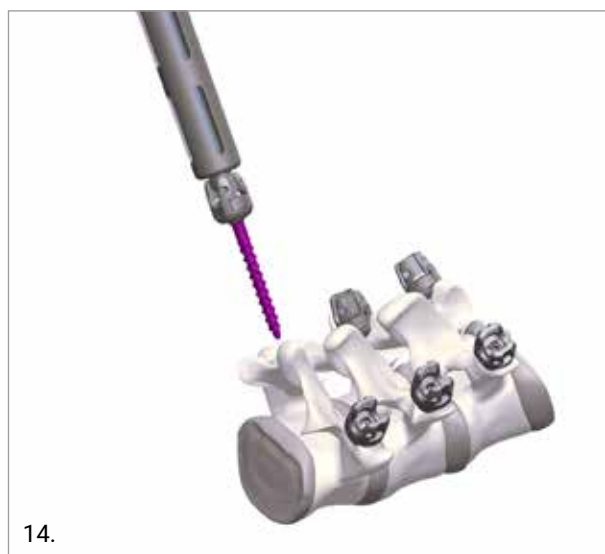
**NOTE:** When using polyaxial screws the correct pedicle screw/poly-axial screwdriver coupling may be reached after a slight rotation and re-alignment of the screw body. When using the monoaxial screws the correct orientation

over the Polyaxial ScrewDriver is already ensured by a “self-alignment” design.

Tighten the head of the pedicle screw to the Polyaxial Screwdriver using the proximal gear, firmly turn it clockwise until the screw is fully tightened. Once secured, it is no longer possible for the screw to move as it is fully engaged with the Polyaxial Pedicle Screwdriver.



Insert the screw into the prepared pedicle canal by turning the Handle clockwise. The screws have a dual lead thread allowing for faster screw insertion.



After satisfactory fixation of the screw you can easily remove the screwdriver from the pedicle screw head by turning the proximal gear counter-clockwise.





### OPTION

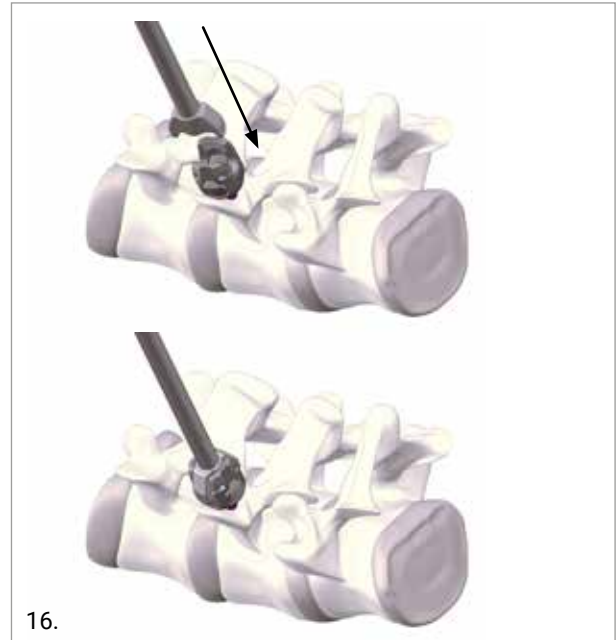
It is possible to use the Bone Screwdriver that does not lock the pedicle screw head (tulip) rotation. The use of the Bone Screwdriver is suggested for further screw advancement, if needed, after the insertion made with the Polyaxial Pedicle Screwdriver.

### OPTION

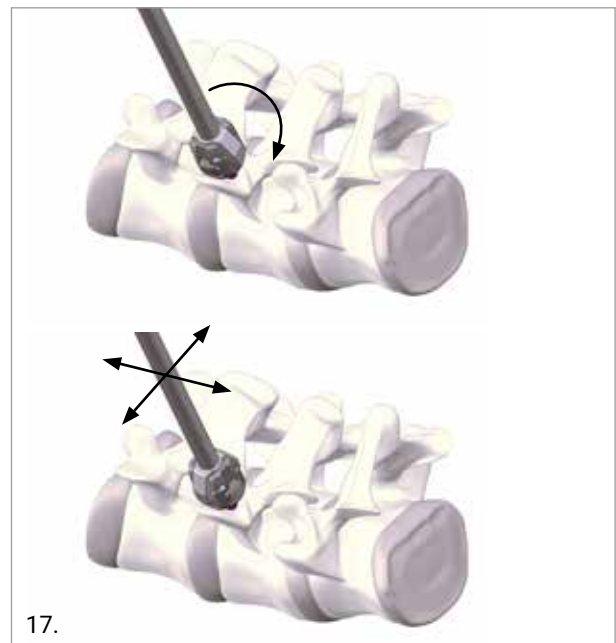
Cannulated screws are available, and can be used following guidewire placement, upon surgeon preference.

## 3.2 HEAD ADJUSTING

After the insertion of the polyaxial pedicle screw, check the orientation of the head and if needed correct it with the Head Adjuster.



The coupling of the Head Adjuster with the polyaxial pedicle screw facilitates screw head adjustment of the inclination in each possible direction.



With the monoaxial pedicle screw, the head orientation can be adjusted with the Head Adjuster allowing for further forward/backward screw advancement.

## 4. ROD CONTOURING AND INSERTION

All rods are available both in Titanium as well as in CoCr alloy with variable lengths, and in both straight and pre-bent forms.

The surgeon can select the rod that most closely approximates the desired saggital contour. The pre-bent Trial Rods (35-100mm) can be used to facilitate the template process.

If further contouring of the rods is required to achieve the desired alignment, it is also possible to bend the rods with the dedicated bending instruments. For longer constructs, a malleable rod (450mm) is available and can be used to template the desired contouring.



### CAUTION

Use only the French Rod Bender available with the standard M.U.S.T. instrumentation to bend the rods. Never bend the rod more than one time. Repeated bending may result in a weakening of the rod and possible rod fracture.

Use the rod insertion forceps to position the rod into the selected pedicle screw heads.

### CAUTION

When possible, position the rod with the laser marking facing posteriorly to help the correct alignment within the screw heads.

## 5. ROD REDUCTION TECHNIQUES

The rod must be completely seated within the pedicle screw heads to allow for final rod manipulation and construct positioning. There are 4 different instrumentation options that can be used to facilitate rod reduction:

- Rod Fork
- 1-Step Reducer
- 2-Steps Reducer
- Locking Tower

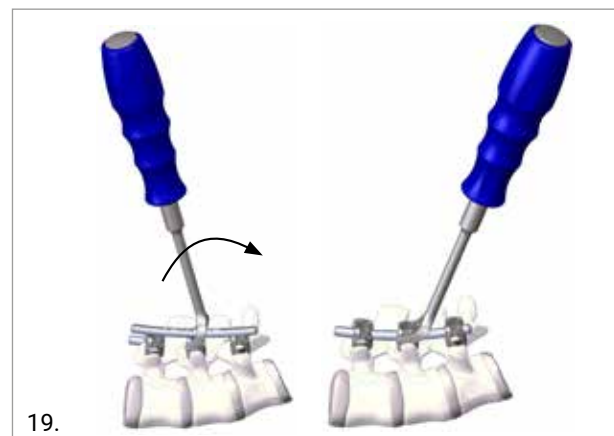
These instruments can aid with the temporary tightening of the set screw before final check of the construct and the final set screw tightening.

### CAUTION

Always place the reduction instrument where the rod is higher to have a more effective rod reduction.

### 5.1 REDUCTION WITH ROD FORK

Place the Rod Fork into the head's reduction sockets. Use only the socket opposite to the side of the reduction to have a better grip on the tulip. To reduce the rod, rock the Rod Fork until the rod is fully seated within the tulip.



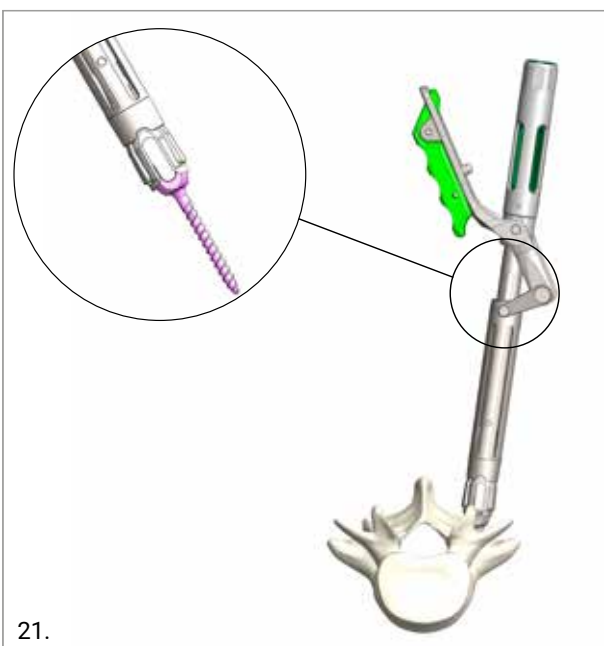
When the desired reduction has been obtained, it is possible to temporarily tighten the set screw using the Temporary Set Screwdriver. The Rod Pusher can be used to aid the rod reduction when needed. The Rod Fork works optimally in conjunction with monoaxial screws.

For detailed instruction about the use of the set screws and temporary tightening, please refer to paragraph 8.1.



## 5.2 REDUCTION WITH 1-STEP REDUCER

The 1-Step Reducer can be used when simple reductions are needed (up to 10 mm). Set the 1-Step Reducer in the open position and then connect it to the screw head at the level where the reduction is needed.



Close the 1-Step Reducer by clipping the lever at the handle; when the desired reduction has been obtained, it is possible to insert the set screw with the Temporary Set Screwdriver to temporarily tighten the set screw into the pedicle screw head.



For detailed instruction about the use of the set screws and temporary tightening, please refer to paragraph 6.1.

### CAUTION

With the monoaxial screw, make sure that the 1-Step Reducer is aligned with the screw head during connection. Check it before closing the lever to avoid the breakage of the instrument.

### 5.3 REDUCTION WITH 2-STEPS REDUCER

The 2-Steps Reducer can be used when a higher reduction power is needed (up to 35 mm).



Set the 2-Steps Reducer in the open position and then connect it to the screw head at the level where the reduction is needed.

Close the 2-Steps Reducer by clipping the lever at the handle; with the locking sleeve fully locked, insert the Reduction Driver into the 2-Steps Reducer up to the beginning of the thread.

To reduce the rod, simply screw the Reduction Driver down through the 2-Steps Reducer.



When the desired reduction has been obtained, it is possible to insert the set screw through with the Temporary Set Screwdriver to temporarily tighten the set screw into the pedicle screw head. For detailed instruction about the use of the set screws and temporarily tightening, please refer to paragraph 8.1

**NOTE:** The Reduction Driver Handle can be removed allowing to reduce the overall hindrance and help facilitating manipulation especially when the two 2-Steps Reducers are placed in series.

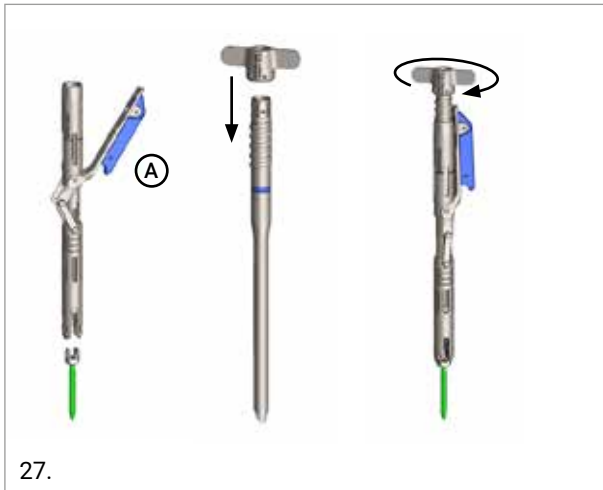


#### CAUTION

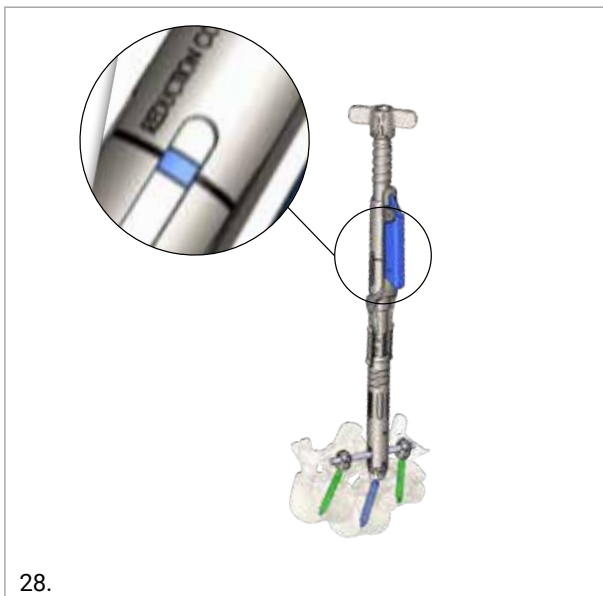
With the monoaxial screw, make sure that the 2-Step Reducer is aligned with the screw head during connection. Check it before starting the reduction to avoid the breakage of the instrument.

#### 5.4 REDUCTION WITH THE LOCKING TOWER

Open the handle on the Locking Tower. Connect the Locking Tower to the screw head at the level where the reduction or the temporary locking fixation is needed. Then close the handle (A). With the locking tower fully locked in position, insert the Reduction Driver into the Locking Tower up to the beginning of the thread.



To reduce the rod, screw the Reduction Driver down through the Locking Tower. When the reduction is completed, the blue ring of the reduction driver will match the marking on the tower (Fig. 28). It is now possible to insert the set screw through the Reduction Driver with the Temporary Set Screwdriver to temporarily tighten the set screw into the pedicle screw head. To disengage the Locking Tower from the pedicle screws, release the blue handle and open the metal lever (A). It is now possible to remove the instrument from the implant. For detailed instruction about the use of the set screws and temporarily tightening, please refer to paragraph 8.1.



#### **WARNING**

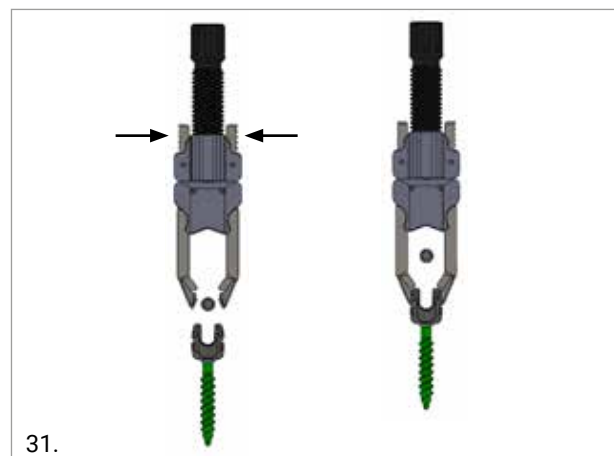
The Locking Tower can NOT be used with Monoaxial screws.

#### 5.5 REDUCTION WITH THE SHORT REDUCER

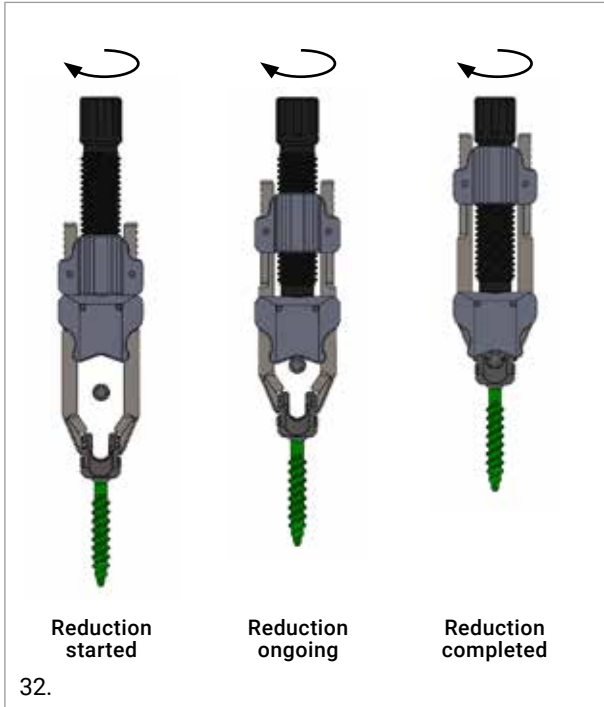
Set the instrument in the open position by turning counter-clockwise the screw.



Connect the instrument to the M.U.S.T. screw by pushing the handle on both sides as showed in the following picture



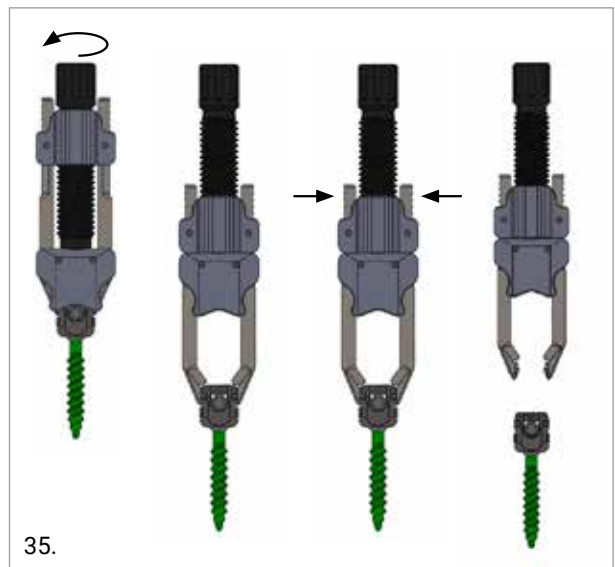
Perform the rod reduction, up to 30mm, by advancing the screw until the rod is seated in the pedicle screw tulip.



Dedicated handles can be connected to the short reducer to facilitate the reduction manoeuvre.



Remove the instrument by releasing the screw completely to reach the open position. Push the handle on both sides and detach the Short Reducer from the pedicle screw tulip.



The setscrew can be inserted with the Temporary Setscrewdriver through the Short Reducer.

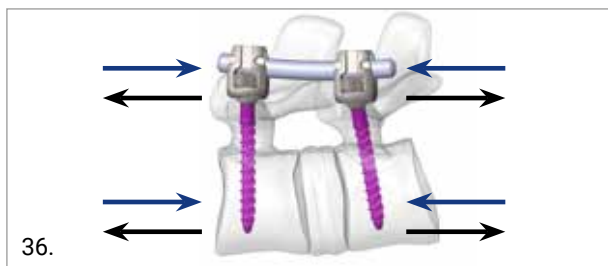


## 6. COMPRESSION OR DISTRACTION

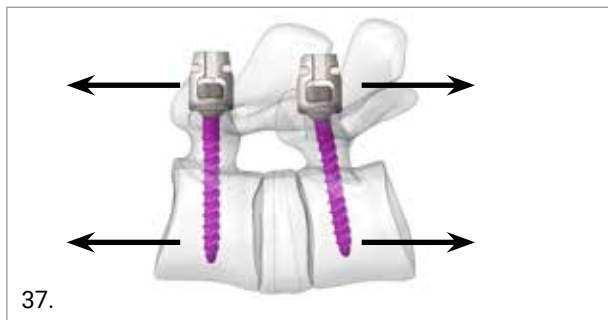
### 6.1 THEORY AND APPLICATIONS

The M.U.S.T. Pedicle Screw system, provides the possibility to perform both parallel compression and parallel distraction as well as adapt the segmental lordosis using the Locking Tower.

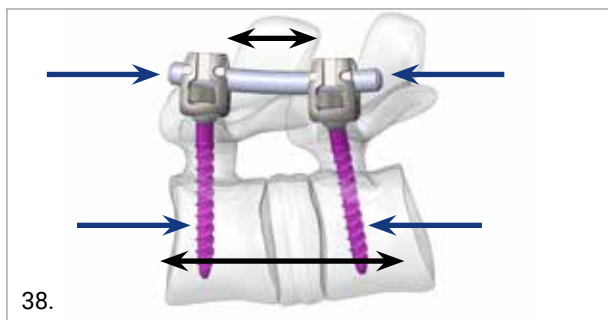
When the polyaxiality of the screw head is locked while one or both tulips are free to slide on the rod, compression or distraction result in a parallel movement of the screw.



Due to the versatility of the Locking Tower, it is possible to perform parallel compression or distraction even without having the rod & set screw in place. Parallel distraction without the rod in place may facilitate a more thorough discectomy and improved access to the anterior aspect of the disc, as well as facilitate a more efficient positioning of the cage.

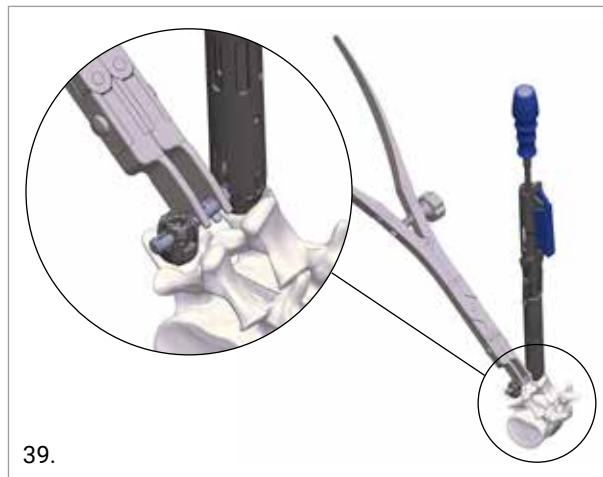


When the screw heads are free to rotate (one or both), compression and distraction result in a modification of the lordosis between the two vertebrae involved.



### 6.2 DISTRACTION

Parallel distraction can be done using the Parallel Distractor with the appropriate Adaptors as well as the Distraction Pliers. Connect the Locking Tower to the pedicle screw and lock one or both of the screw heads (tulips) to perform parallel distraction.



After a satisfactory relative position of the vertebrae has been achieved, it is possible to temporarily tighten the set screw in the tulip with the Temporary Set Screwdriver passing through the Locking Tower.

To perform simple distraction without maintaining the parallelism between the vertebrae, apply the Distraction Pliers or the Parallel Distractor adding the appropriate Adaptors.



After a satisfactory relative position of the vertebrae has been achieved it is possible to temporary tighten the set screws with the Temporary Set Screwdriver.



### 6.3 COMPRESSION

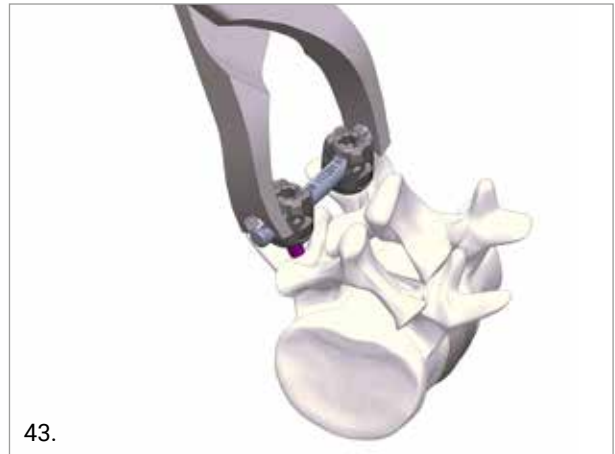
Parallel compression can be done using the Parallel Compressor with the appropriate Adaptors as well as the Compression Pliers. Connect the Locking Tower to the pedicle screw and lock one or both of the screw heads (tulips) to perform parallel compression



After a satisfactory relative position of the vertebrae has been achieved, it is possible to temporarily tighten the set screw in the tulip with the Temporary Set Screwdriver passing through the Locking Tower.



To perform simple compression without maintaining the parallelism between the vertebrae, apply the Compression Pliers or the Parallel Compressor adding the appropriate Adaptors.



After a satisfactory relative position of the vertebrae has been achieved it is possible to temporary tighten the set screws with the Temporary Set Screwdriver.

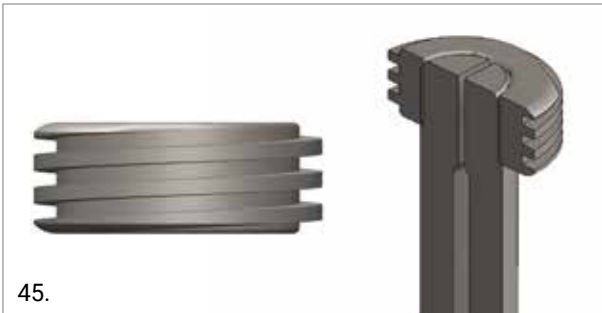


## 7. IN SITU BENDING

In the standard instrumentation, several bending instruments are available to perform in situ coronal and sagittal rod bending as well as rod rotation.

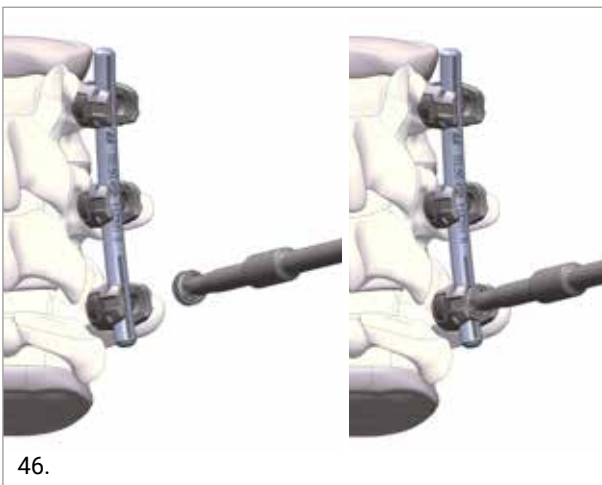
## 8. TIGHTENING

By tightening the set screws, the rod locks the polyaxiality of the head of the pedicle screw as well as the total final construct .



### 8.1 TEMPORARY SET SCREW TIGHTENING

The Temporary Set Screwdriver has a retentive tip that allow easy positioning and temporary tightening of the set screw. Align the set screw with the thread on the pedicle screw head and tighten. Other instruments are available in the standard instrumentation to position the set screws.



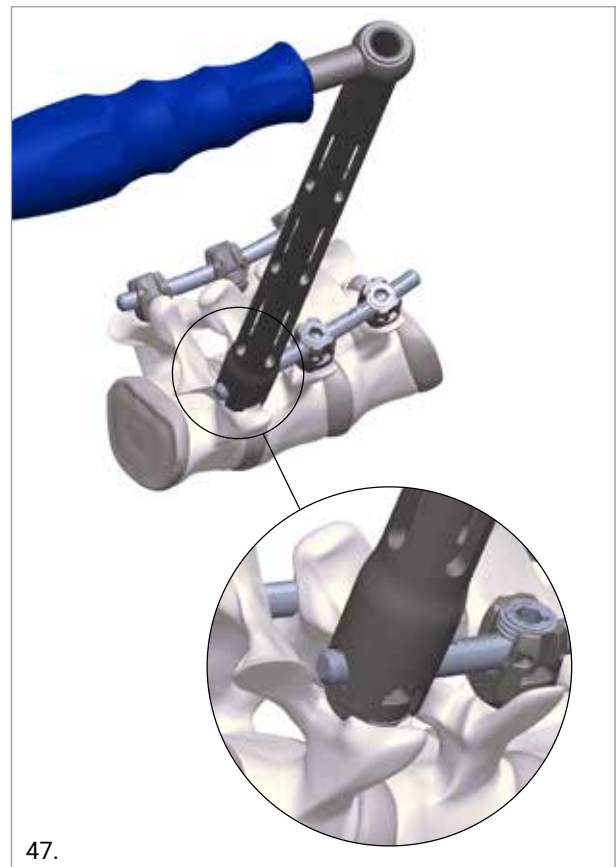
#### **WARNING**

The interface between the set screw and the Set Screwdriver is not intended for the screw head adjustment. To orientate the tulip the provided Counter Torque can be used.

### 8.2 FINAL SET SCREW TIGHTENING

For the final tightening, engage the Counter Torque to the pedicle screw head.

Connect the Ratcheting Handle to the 9Nm Torque Limiter Set Screwdriver and insert it into the Counter Torque. Firmly hold the Counter Torque and screw the set screw into the pedicle screw head with the Torque Limiter Set Screwdriver until the audible noise sounds. Audible noise is an indication that final tightening of 9 Nm has been achieved.

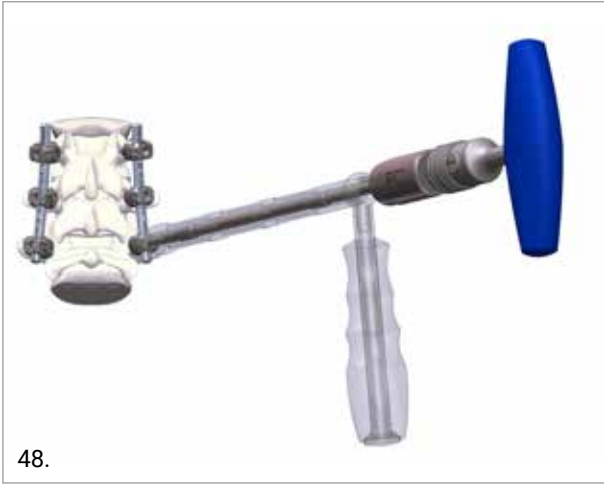


#### **CAUTION**

The Counter Torque is available in 2 configurations :  
 A Counter Torque which couples to the pedicle screw head socket by means of two distal teeth; caution must be taken when the instrument has to engage with the screw to pursue a correct teeth/ sockets interface.  
 A 4 arms Counter Torque which couples around the pedicle screw head has to be correctly aligned onto the head;

#### **CAUTION**

If you have to reposition the set screw in place after the final tightening please proceed to untighten it and use a new Set Screw.



**OPTION**

A Modular Torque Limiter is available. It is designed in two parts (shaft and module) in order to facilitate the maintenance of the instrument and to have different options within a single module:

- It is compatible with hex setscrews as well as with combined setscrews;
- It has the correct dimensions to fit the long countertorque and the short one.

For correct assembly, align the module to the shaft, following the marked arrow and line, then push the module fully inside the shaft, until the “click” is heard.



**9. CROSS CONNECTOR**

M.U.S.T. Link cross connectors can be used to increase the stability of the construct.

Once the final tightening of the set screws is complete, use the Transverse Connector Sizer (Fig.50) to determine the correct size of the M.U.S.T. Link.

Set the notched ends of the measuring device over one rod and open it until it reaches the other rod, then read the final size (Fig. 51).

The slider, in addition to the numerical scale, is colour coded to provide quick identification of connector sizes.

**NOTE:** If the measurement falls between two colours, both connectors can be used.



It is also possible to use the M.U.S.T. Cross Connector Measuring Device (Fig. 52): set the notched ends of the measuring device over both the rods and read the final size.



**NOTE:** The table below provides a summary of the correct Straight Cross-Connector size selection:

Rod distance	Recommended size	Reference
10-25	20	03.56.402
26-35	30	03.56.403
36-45	40	03.56.404
46-55	50	03.56.405
56-65	60	03.56.406
66-75	70	03.56.407
76-85	80	03.56.408
86-95	90	03.56.409
96-105	100	03.56.410

Use the Rod Insertion Forceps to pick up the appropriate M.U.S.T. Link Cross Connector and snap it onto the rods.



Confirm that the M.U.S.T. Link is correctly connected to the rods.



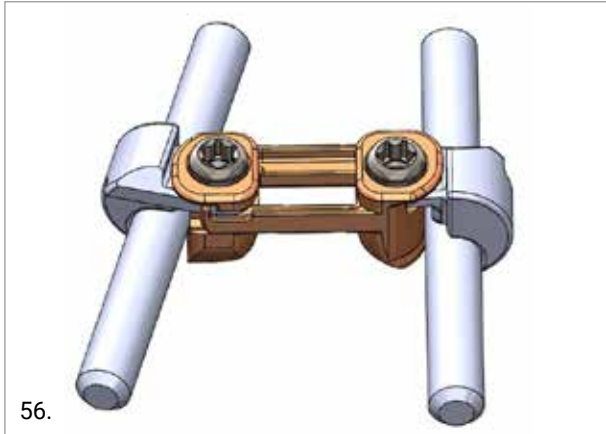
For the final tightening, engage the Counter Torque to the pedicle screw head and use the 5.5Nm Torque Limiter Set Screw Driver to fix the Set screw.



#### M.U.S.T. MC cross connector

As an alternative to the M.U.S.T. Link cross connectors and straight cross connector, there is also the option of the M.U.S.T. MC cross connector. This device has been designed with a minimized profile and is intended for use with rods between 19 and 40mm in length. For the final tightening use the 5.5Nm Torque limiter set screwdriver to fix the Set Screw.

Two version of the M.U.S.T. MC cross connector are available. In the straight version the hook can tilt  $\pm 5^\circ$ , in the adjustable  $\pm 15^\circ$ .



**ROD LENGTH MEASUREMENT**

Place the Rod Caliper into the screw heads and read (on the side marked with "rod length" – see image below) the optimal size of rod to be implanted on the marked plate.

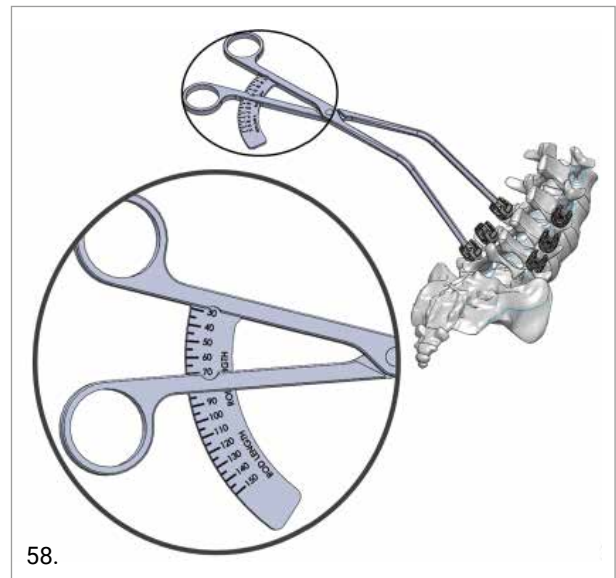
**NOTES:**

- The rod caliper shows the optimal size of rod to be implanted, not the distance between the two pedicle screw heads
- In case of an intermediate rod size measurement, choose the longer rod size
- The rod caliper provides an indication for rod size up to a maximum length of 150mm; rods longer than 150mm can be evaluated by the sum of multiple measurements

**9.1 ROD CALIPER**

The new Rod Caliper is designed to help the surgeon in choosing the correct rod length:

- The correct rod length



## 10. HOOKS

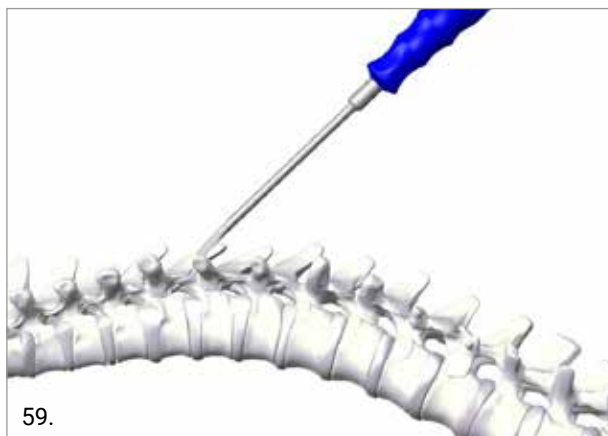
A comprehensive Hook system is available in order to fit the unique anatomy of the posterior elements especially to meet the different needs of patients suffering of scoliosis and other deformities. Several Hook Implants are available and can be used depending from the different anatomical site and up to the required needs:

HOOK TYPE	ANATOMICAL PLACEMENT SITE	BLADE DIRECTION	SPINE REGION
Pedicle Hook	Articular Process	↑	Thoracic
Extended Body Hook	Lamina / Transverse Process	↓↑	Thoracic / Lumbar
Wide Blade Hook	Lamina / Transverse Process	↓↑	Thoracic / Lumbar
Angled Hook	Lamina	↓	Thoracic
Offset Hook	Lamina / Transverse Process	↓↑	Thoracic / Lumbar
Narrow Blade Hook	Lamina / Transverse Process	↓↑	Thoracic / Lumbar

### 10.1 PEDICLE HOOK PLACEMENT

#### Pedicle Preparation

Use the Pedicle Elevator to open the facet capsule and locate the pedicle.



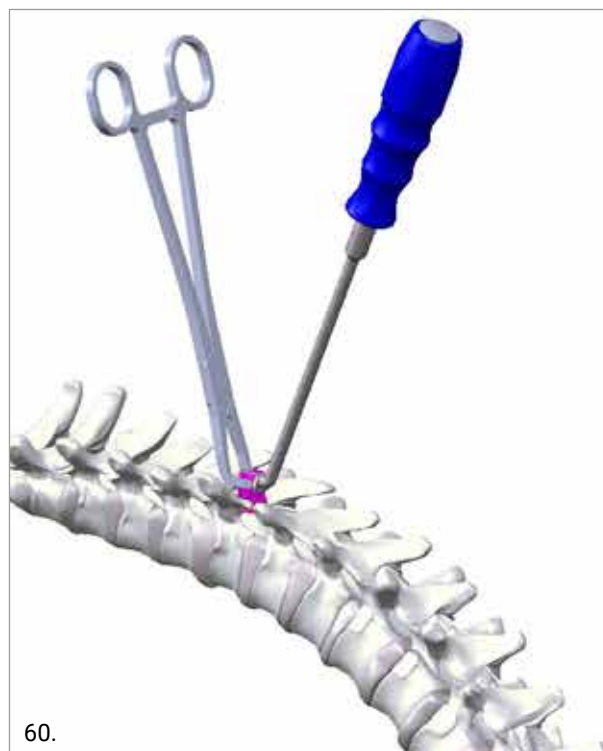
Use the chisel to remove a small part of the inferior articular process and ensure a proper seating of the pedicle hook.

#### **WARNING**

The Pedicle hooks opening must face upwards.

#### Trial Selection

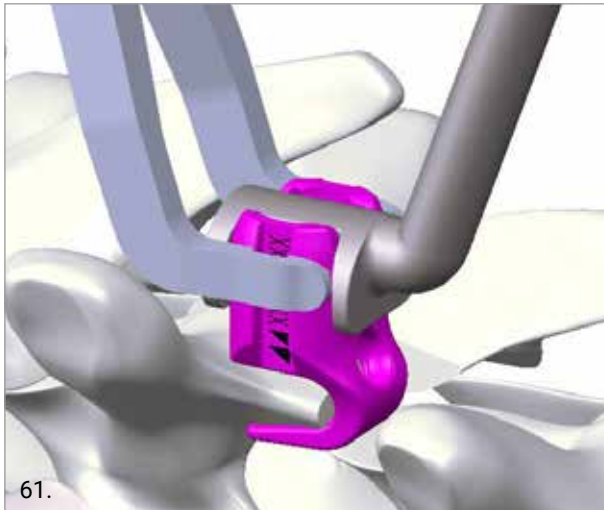
The use of the Pedicle Hook Trials is meant to determine the proper implant size. Use the Hook Forceps to position the Pedicle Hook Trials in place. The Hook Pusher can also be utilized to facilitate the placement.





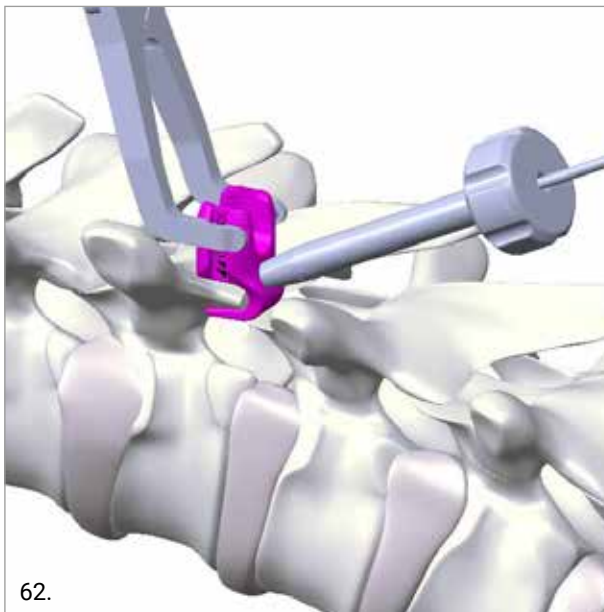
**Pedicle Hook Implantation**

After the Pedicle Hook size has been determined, choose the appropriate Pedicle Hook for the implantation. Attach the Hook with the Hook Forceps and place it in the desired position; use the Hook Pusher to facilitate the placement.



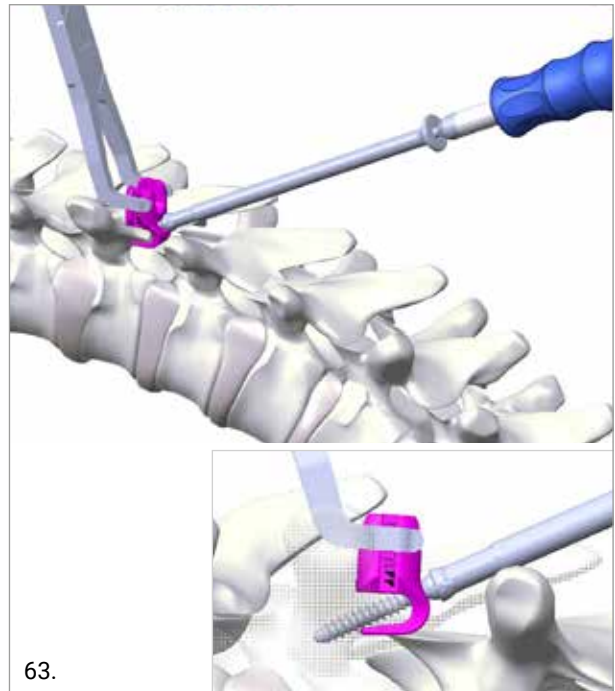
61.

Insert the drill guide in the hole at the back of the Pedicle Hook and drill a Ø2.0mm hole using an oscillating drill.



62.

Remove the Drill Guide and determine the screw length with the Depth Gauge. Securely anchor the pedicle hook in place with the Ø3.2mm screw using the Pedicle Hook Screwdriver.



63.

Repeat the process for each Pedicle Hook.

**10.2 HOOK PLACEMENT IN THE LAMINA/ TRANSVERSE PROCESS**

**Lamina Preparation**

Use the Lamina Elevator to separate the ligamentum flavum from the lamina to ensure good bony contact with the hook.

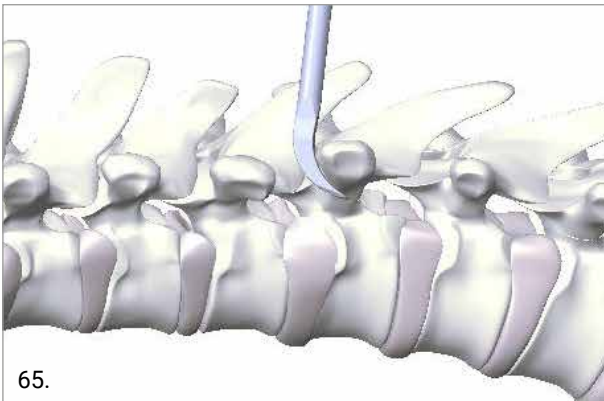


64.

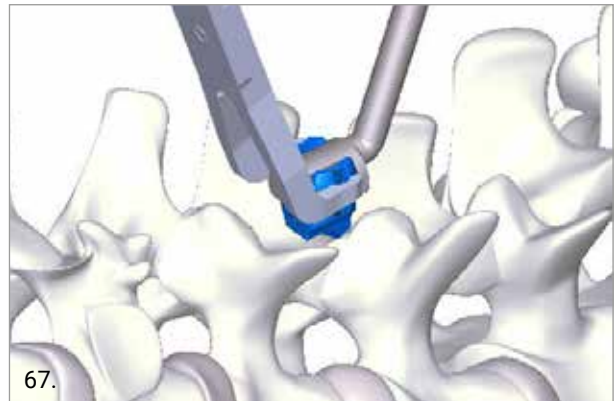
**Transverse Process Preparation**

Use the Transverse Process Elevator to separate the ligamentum flavum from the underside of the transverse process.





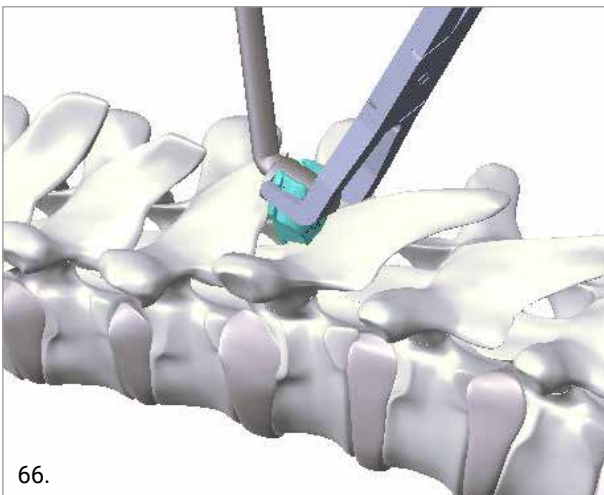
65.



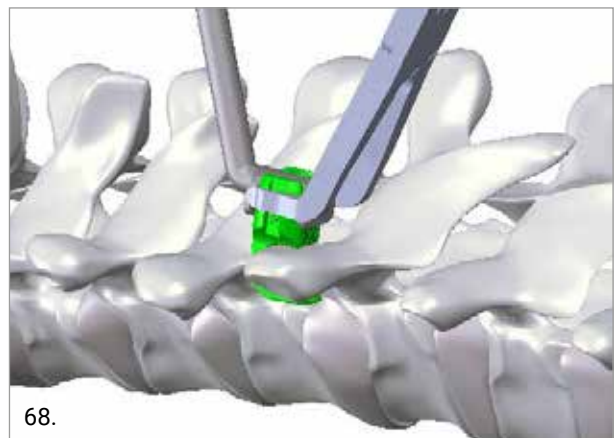
67.

### Hook Implantation

After the hook size has been determined with the Trial selection, choose the appropriate Hook for the implantation. Attach the hook with the Hook Forceps and place it in the desired position, either the Lamina or the Transverse process, and use the Hook Pusher to facilitate the placement.



66.



68.

**NOTE:** Hooks can be placed with either supra- or intra-laminar positioning.

Repeat the process for each Lamina/Transverse Process hook.

In order to perform the following surgical steps please refer to the same technique above described, i.e:

- Rod Contouring and Insertion (Chapter 4)
- Rod Reduction Techniques (Chapter 5)
- Compression and distraction (Chapter 6)
- In situ Bending (Chapter 7)
- Tightening (Chapter 8)

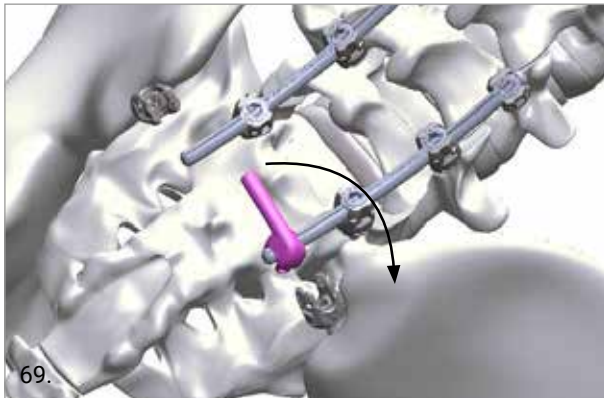
## 11. LATERAL CONNECTORS

The lateral connectors allow for medial/lateral variability helping to lining up screws to the rod. These implants can be used for iliac fixation including leveling pelvic obliquity, correcting coronal and sagittal imbalance, and providing rigid fixation to help prevent recurrent deformity.

### Lateral Connectors Positioning

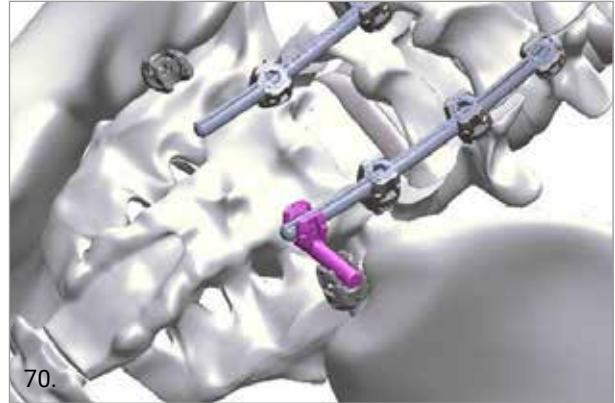
Instrument the spine with a rod construct down to S1 according to the surgical technique above described.

Select the lateral connector of the appropriate length and insert it into the rod with the opening facing down. Rotate the lateral connector and adjust the vertical shift on the Rod as to engage it with the iliac pedicle screw head.

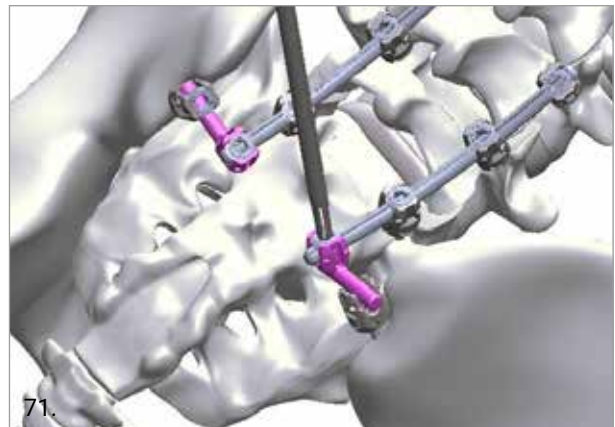


### CAUTION

Potential metal fragments have to be removed from the implant to avoid any adverse reaction because of dissimilar metals.



Provisionally tighten the set screw of both the lateral connector and the pedicle screw with the Temporary Set Screwdriver as described in Chapter 8.1.



Perform final tightening of the lateral connector as well as the iliac pedicle screw as described in chapter 8.2. Repeat the process for the counter side.

### OPTION

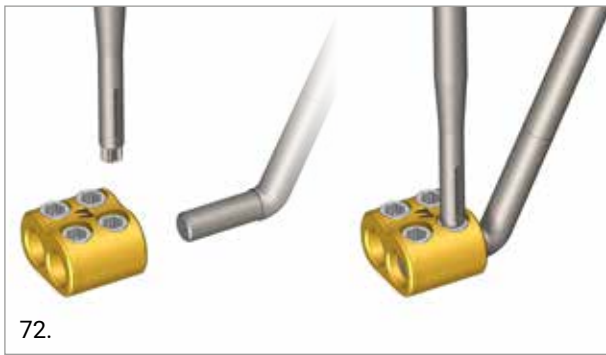
It is also possible to insert all screws and iliac connectors first, and then apply the rod.

## 12. ROD-TO-ROD CONNECTORS

The rod-to-rod connectors allow for the in-line or parallel connection of two rods according to the surgical need. It is also possible to connect two different rod diameters and to choose between the open or closed profile of the domino connector itself.

### 12.1 ROD-TO-ROD CONNECTORS POSITIONING

Select the rod-to-rod connector of the appropriate size using the connector inserter and tighten one set screw, using the connector screwdriver, to temporarily secure it to the connector inserter.



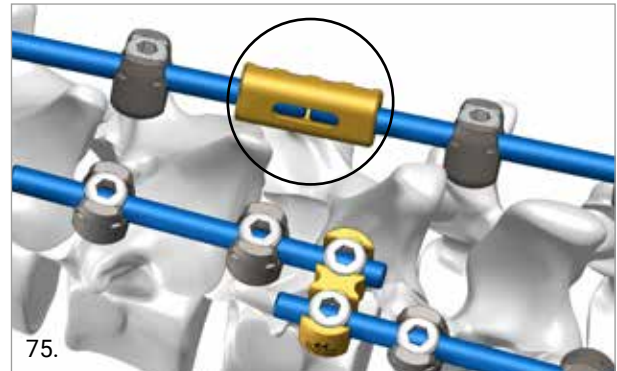
Then, using the connector inserter, insert it by sliding it onto the rod that is already in position and lock temporarily the set screws with the connector screwdriver. Slide out the connector inserter, insert the rod to be connected and proceed with the final tightening of the set screws with using the 5.5Nm torque limiter.



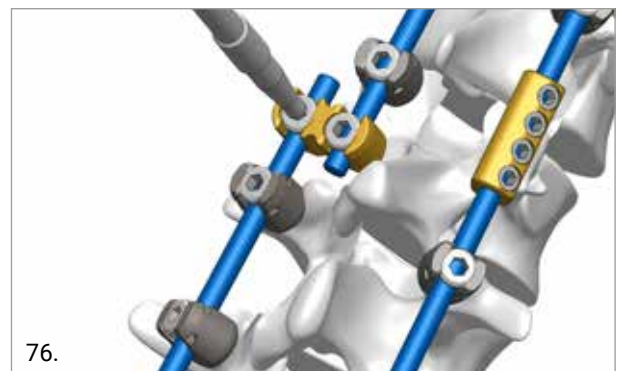
If Open connector are used, the same can be inserted on the rod from the side.



When using the In-line connectors it is also possible to inspect the rod final position through the opening on the connector itself (as shown in the picture below).



Where tulip based connector are used, final tightening must be performed using the 9Nm Torque Limiter as this connector is provided with the standard MUST set screws.



### 13. IMPLANTS NOMENCLATURE

#### 13.1 STERILE SINGLE PACKAGE

##### POLYAXIAL PEDICLE SCREWS - SOLID

REFERENCE <sup>1</sup>	DIAMETER (mm)	LENGTH (mm)
03.50.151	4	20
03.50.152		25
03.50.153		30
03.50.154		35
03.50.155		40
03.50.156		45
03.50.157		50
03.50.001	4,5	20
03.50.002		25
03.50.003		30
03.50.004		35
03.50.005		40
03.50.006		45
03.50.007		50
03.50.008	5	25
03.50.009		30
03.50.010		35
03.50.011		40
03.50.012		45
03.50.013		50
03.50.014	6	25
03.50.015		30
03.50.016		35
03.50.017		40
03.50.018		45
03.50.019		50
03.50.020		55
03.50.021		60
03.50.022		65
03.50.028		7
03.50.029	35	
03.50.030	40	
03.50.031	45	
03.50.032	50	
03.50.033	55	
03.50.034	60	
03.50.035	65	
03.50.036	70	
03.50.038	80	
03.50.040	90	

<sup>1</sup> includes 1 screw and 1 set screw

##### POLYAXIAL PEDICLE SCREWS - SOLID

REFERENCE	DIAMETER (mm)	LENGTH (mm)
03.50.050	8	20
03.50.051		25
03.50.052		30
03.50.053		35
03.50.054		40
03.50.055		45
03.50.056		50
03.50.057		55
03.50.058		60
03.50.059		65
03.50.060		70
03.50.061		75
03.50.062		80
03.50.063		85
03.50.064		90
03.50.065		95
03.50.066	100	
03.50.070	9	30
03.50.071		35
03.50.072		40
03.50.073		45
03.50.074		50
03.50.075		55
03.50.076		60
03.50.077		65
03.50.078		70
03.50.079		75
03.50.080		80
03.50.081		85
03.50.082		90
03.50.083		95
03.50.084	100	
03.50.090	10	30
03.50.091		35
03.50.092		40
03.50.093		45
03.50.094		50
03.50.095		55
03.50.096		60
03.50.097		65
03.50.098		70
03.50.099		75
03.50.100		80
03.50.101		85
03.50.102		90
03.50.103		95
03.50.104	100	

### ENHANCED POLY-AXIAL PEDICLE SCREW - CANNULATED

REFERENCE <sup>1</sup>	DIAMETER (mm)	LENGTH (mm)
03.52.301	4.5	20
03.52.302		25
03.52.303		30
03.52.304		35
03.52.305		40
03.52.306		45
03.52.307		50
03.52.311	5	25
03.52.312		30
03.52.313		35
03.52.314		40
03.52.315		45
03.52.316		50
03.52.320	6	25
03.52.321		30
03.52.322		35
03.52.323		40
03.52.324		45
03.52.325		50
03.52.326		55
03.52.327		60
03.52.328		65
03.52.335	7	30
03.52.336		35
03.52.337		40
03.52.338		45
03.52.339		50
03.52.340		55
03.52.341		60
03.52.342		65
03.52.343		70
03.52.345		80
03.52.347	90	

<sup>1</sup> includes 1 screw and 1 set screw

\*Note: Enhanced Poly-Axial Pedicle Screw are also compatible with MUST Percutaneous system, see surgical technique ref. 99.perc46.12.

### MONOAXIAL PEDICLE SCREW SOLID

REFERENCE <sup>1</sup>	DIAMETER (mm)	LENGTH (mm)
03.50.220	4.5	25
03.50.221		30
03.50.222		35
03.50.223		40
03.50.224		45
03.50.225		50
03.50.226		55
03.50.227		60
03.50.228		65
03.50.230	5	25
03.50.231		30
03.50.232		35
03.50.233		40
03.50.234		45
03.50.235		50
03.50.236		55
03.50.237		60
03.50.238		65
03.50.240	6	25
03.50.241		30
03.50.242		35
03.50.243		40
03.50.244		45
03.50.245		50
03.50.246		55
03.50.247		60
03.50.248		65
03.50.250	7	25
03.50.251		30
03.50.252		35
03.50.253		40
03.50.254		45
03.50.255		50
03.50.256		55
03.50.257		60
03.50.258		65
03.50.260	8	25
03.50.261		30
03.50.262		35
03.50.263		40
03.50.264		45
03.50.265		50
03.50.266		55
03.50.267		60
03.50.268		70
03.50.269		80
03.50.270		90



**MONOAXIAL CANNULATED PEDICLE SCREW (DUAL-DIAMETER)\***

REFERENCE <sup>1</sup>	DIAMETER (mm)	LENGTH (mm)
03.52.206	5	30
03.52.207		35
03.52.201		40
03.52.202		45
03.52.203		50
03.52.204		55
03.52.205		60
<hr/>		
03.52.216	6	30
03.52.217		35
03.52.211		40
03.52.212		45
03.52.213		50
03.52.214		55
03.52.215		60
<hr/>		
03.52.227	7	35
03.52.221		40
03.52.222		45
03.52.223		50
03.52.224		55
03.52.225		60

1 includes 1 screw and 1 set screw

\*Note: Monoaxial Cannulated Pedicle Screws are also compatible with M.U.S.T. Percutaneous system, see surgical technique ref. 99.perc46.12.

\*Note: Monoaxial Cannulated Pedicle Screws are also compatible with M.U.S.T. Fenestrated system, see surgical technique ref. 99.FS46.12.

**M.U.S.T. MC CROSS CONNECTOR**



REFERENCE	DESCRIPTION
03.56.501	M.U.S.T. MC Cross-Connector 19-29mm straight
03.56.502	M.U.S.T. MC Cross-Connector 27-40mm straight
03.56.503	M.U.S.T. MC Cross-Connector 19-29mm adjustable
03.56.504	M.U.S.T. MC Cross-Connector 27-40mm adjustable

**SET SCREW**

REFERENCE	DESCRIPTION
03.50.200	Set screw HEX (1x)
03.50.204	Set screw H4-T27 (4x)

**STRAIGHT RODS**

REFERENCE	MATERIAL	DIAMETER X LENGTH (mm)
03.50.400	Titanium	5.5 x 100
03.50.401		5.5 x 200
03.50.402		5.5 x 300
03.50.403		5.5 x 480
<hr/>		
03.50.430	Cobalt-Chrome	5.5 x 100
03.50.431		5.5 x 200
03.50.432		5.5 x 300
03.50.433		5.5 x 480

**M.U.S.T. LINK CROSS CONNECTOR**



REFERENCE	SIZE (mm)
03.56.035	35 - 42
03.56.040	40 - 50
03.56.048	48 - 66
03.56.064	64 - 98

**STRAIGHT CROSS CONNECTOR**











REFERENCE	SIZE (mm)
03.56.402	20
03.56.403	30
03.56.404	40
03.56.405	50
03.56.406	60
03.56.407	70
03.56.408	80
03.56.409	90
03.56.410	100

**PRE-BENT RODS**

REFERENCE	MATERIAL	DIAMETER X LENGTH (mm)
03.50.450	Titanium	5.5 x 35
03.50.451		5.5 x 40
03.50.452		5.5 x 45
03.50.453		5.5 x 50
03.50.454		5.5 x 55
03.50.455		5.5 x 60
03.50.456		5.5 x 65
03.50.457		5.5 x 70
03.50.458		5.5 x 75
03.50.459		5.5 x 80
03.50.460		5.5 x 85
03.50.461		5.5 x 90
03.50.462		5.5 x 95
03.50.463		5.5 x 100
03.50.470	Cobalt-Chrome	5.5 x 35
03.50.471		5.5 x 40
03.50.472		5.5 x 45
03.50.473		5.5 x 50
03.50.474		5.5 x 55
03.50.475		5.5 x 60
03.50.476		5.5 x 65
03.50.477		5.5 x 70
03.50.478		5.5 x 75
03.50.479		5.5 x 80
03.50.480		5.5 x 85
03.50.481		5.5 x 90
03.50.482		5.5 x 95
03.50.483		5.5 x 100



**IMPLANTS**

REFERENCE	DESCRIPTION	PICTURE
03.50.600	Extended Body Hook XS	
03.50.601	Extended Body Hook S	
03.50.602	Extended Body Hook M	
03.50.603	Extended Body Hook L	
03.50.604	Extended Body Hook XL	
03.50.611	Wide Blade Hook S	
03.50.612	Wide Blade Hook M	
03.50.613	Wide Blade Hook L	
03.50.620	Pedicule Hook XS	
03.50.621	Pedicule Hook S	
03.50.622	Pedicule Hook M	
03.50.623	Pedicule Hook L	
03.50.625	Pedicule Hook Screw 15mm	
03.50.626	Pedicule Hook Screw 20mm	
03.50.631	Angled Hook Right	
03.50.634	Angled Hook Left	
03.50.643	Offset Hook Left	
03.50.646	Offset Hook Right	
03.50.651	Narrow Blade Hook S	
03.50.652	Narrow Blade Hook M	
03.50.653	Narrow Blade Hook L	
03.56.100	Lateral Connector 20mm	
03.56.101	Lateral Connector 40mm	
03.56.102	Lateral Connector 60mm	

**ANODIZED RODS**

REFERENCE	DESCRIPTION	PICTURE
03.50.800	Rod Ti Anodized 5.5x100mm	
03.50.801	Rod Ti Anodized 5.5x200mm	
03.50.802	Rod Ti Anodized 5.5x300mm	
03.50.803	Rod Ti Anodized 5.5x480mm	

### "DOMINO" ROD-TO-ROD CONNECTOR

REFERENCE	DESCRIPTION	PICTURE	ROD Ø (mm)	ROD MIN DISTANCE (INNER CLEARANCE) (MM)	CONNECTOR LENGTH (MM)	CONNECTOR MAX WIDTH (MM)
03.56.200	In line connector		From 5.5 up to 6.35 (both sides)	n.a.	29	10.4
03.56.205	In line connector Open 5.5		5.5 (both sides)	n.a.	31	14.2
03.56.206	In line connector Open 6.35		From 5.5 up to 6.35 (both sides)	n.a.	31	14.2
03.56.300	Domino connector		From 5.5 up to 6.35 (both sides)	1.5	16	19
03.56.301	Domino connector Wide		From 5.5 up to 6.35 (both sides)	5.5	16	23
03.56.302	Domino connector Vertical Screws		From 5.5 up to 6.35 (both sides)	1.5	16	19
03.56.303	Domino connector Vertical Screws Wide		From 5.5 up to 6.35 (both sides)	5.5	16	23
03.56.305	Domino connector Open 5.5		5.5 (both sides)	6	16	22.5
03.56.306	Domino connector Open 6.35		From 5.5 up to 6.35 (both sides)	5.2	16	22.5
03.56.307	Top Loading ("tulip based") Connector Wide		5.5 (both sides)	9.4	10.5	28.5
03.56.310	Top Loading ("tulip based") Connector		5.5 (both sides)	6.4	10.5	25.5
03.56.211	M.U.S.T. Connector Setscrew (1x)					
03.56.212	M.U.S.T. Connector Setscrew (2x)					







Part numbers subject to change.

## **NOTE FOR STERILISATION**

In case the instrumentation is not sterile upon delivery, it must be cleaned before use and sterilized in an autoclave respecting the regulation of the country, EU directives where applicable and following the instructions for use of the autoclave manufacturer.

For detailed instructions please refer to the document "Recommendations for cleaning decontamination and sterilization of Medacta International reusable orthopedic devices" available at [www.medacta.com](http://www.medacta.com).



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**REDEFINING BETTER  
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M.U.S.T.<sup>®</sup>  
Surgical Technique

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