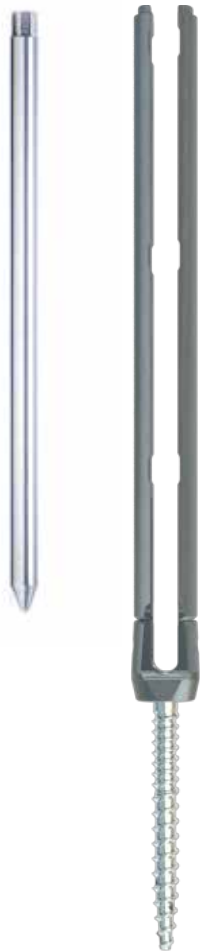


● CLOVER



misano<sup>MIS</sup>

## CONCEPT & DESIGN



The Misano MIS system was designed with the goal of providing surgeons with a complete device for the treatment of various pathologies affecting the spine, whether degenerative, traumatic, or tumor, and for the treatment of deformities.

The self-threading screws can be inserted without tapping and feature double threads for easy insertion and improved pedicle hold.

The screws are also fenestrated to allow cementing. The head of the screws features a long tulip with an internal thread that simplifies the insertion of the nut and consequently the seating in place of the rod.

Appropriately used, the Misano MIS thoracolumbar-sacral stabilization system from Clover Orthopedics is indicated to promote the development of solid thoracic, lumbar and sacral arthrodesis. It is recommended in cases of spinal deformity, degenerative disc disease, traumatic vertebral fractures, vertebral tumors, spinal stenosis, spondylolisthesis, pseudoarthrosis, and previous unsuccessful attempts at vertebral arthrodesis. Any surgical decisions other than those recommended by the manufacturer are at the discretion and responsibility of the surgeon.

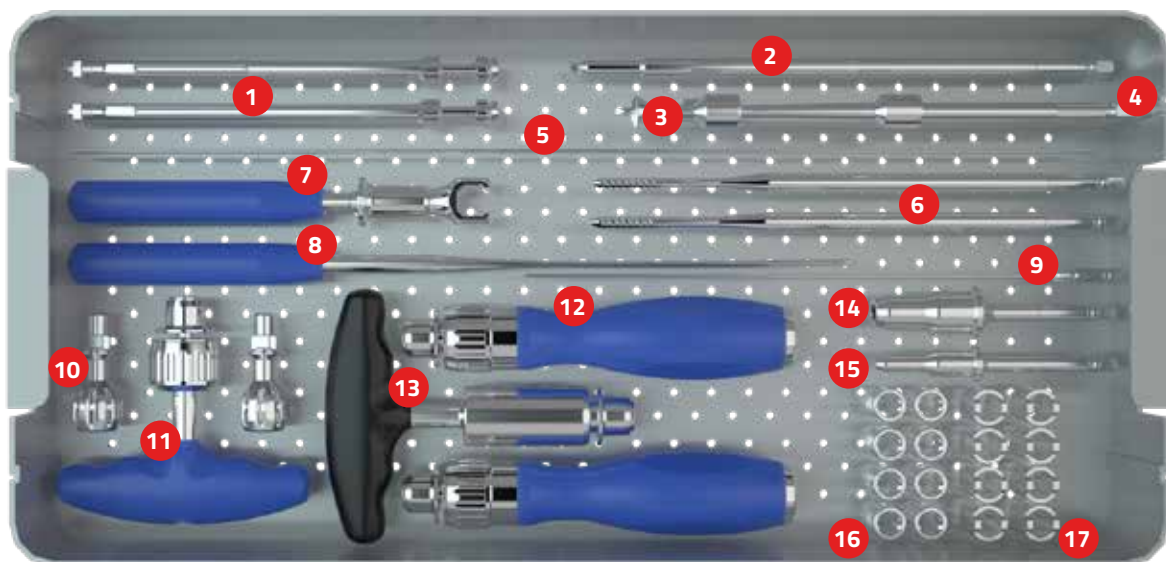
Do not use 4.5 mm diameter screws in the lumbar and lumbosacral spine, and do not couple 4.5 mm diameter screws with CoCr rods.

## INSTRUMENTS



Clover has invested heavily in instrument design and care with the goal of creating ergonomic, functional, and compact instrumentation. Designed for the surgeon and his team.

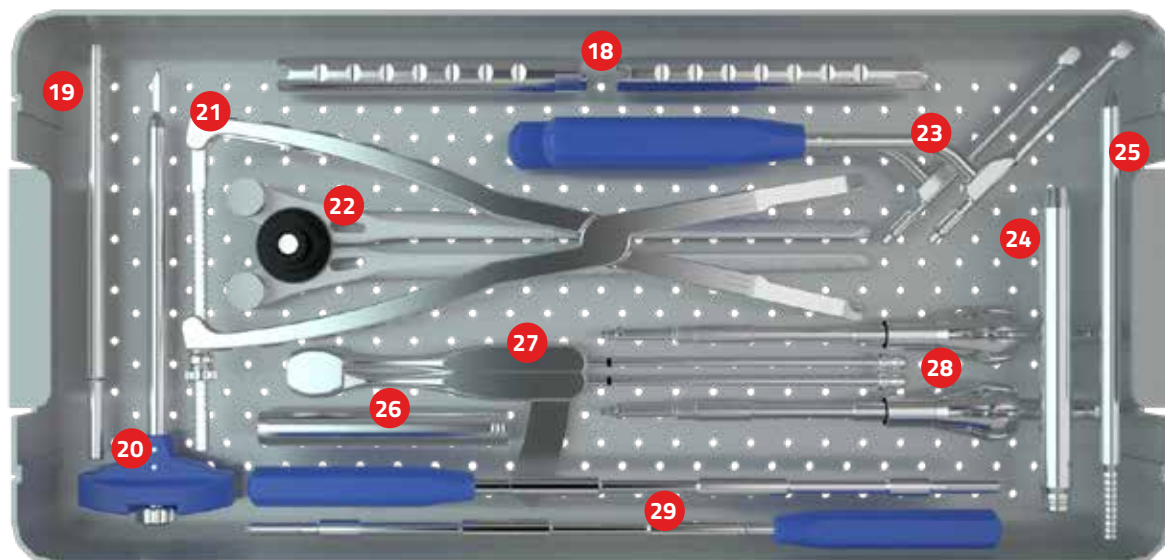
### TRAY 1



<b>1</b> CEMENT NEEDLE ADAPTER	MSN-K0SS002005	<b>8</b> TISSUE DISSECTOR	MSN-T0SS000005
<b>2</b> DUAL LEAD CAP SCREWDRIVER	MSN-I1SS285255	<b>9</b> PIPE CLEANER	MSN-J2SS000005
<b>3</b> REAMING AWL	MSN-A1SS035075	<b>10</b> TULIP ALIGNMENT	MSN-K0SS000555
<b>4</b> SCREW TAB REMOVER	MSN-Z2SS000025	<b>11</b> RATCHETING T HANDLE	MSN-H1SS001005
<b>5</b> GUIDE WIRE TROCAR	MSN-K0NT005005	<b>12</b> RATCHETING HANDLE	MSN-H0SS001005
<b>6</b> TAP 4.5MM	MSN-J0S 5000455	<b>13</b> DINAMOMETRIC T HANDLE 9NM	MSN-H1SS000905
TAP 5.5MM	MSN-J0SS000555	<b>14</b> PIVOT 2	MSN-Z1SS000025
TAP 6.5MM	MSN-J0SS000655	<b>15</b> PIVOT 1	MSN-Z1SS000015
TAP 7.5MM	MSN-J0SS000755	<b>16</b> SUPERIOR RING	MSN-K2SS000155
<b>7</b> COUNTER TORQUE HANDLE	MSN-H2SS000005	<b>17</b> SLIDING RING	MSN-K2SS000255

## INSTRUMENTS

### TRAY 2



<b>18</b> MIS GAUGE	MSN-K35S001385	<b>24</b> DILATOR N.2	MSN-L25S14409S
<b>19</b> MIS ROD PUSHER	MSN-P15S000015	<b>25</b> DILATOR N.1	MSN-L05S20002S
<b>20</b> MIS TROCAR	MSN-A15S02922S	<b>26</b> DILATOR N.3	MSN-L25S11514S
<b>21</b> MIS COMPRESSOR	MSN-N05S00002S	<b>27</b> MIS CALIPER	MSN-M15S00000S
<b>22</b> ROD BENDER	MSN-F05S00000S	<b>28</b> DUAL LEAD MIS SCREWDRIVER	MSN-I25S24520S
<b>23</b> MIS ROD HOLDER	MSN-D15S00000	<b>29</b> CAP HOLDER	MSN-I05S30025S

**INSTRUMENTS**

CEMENT NEEDLE ADAPTER      MSN-K05S00200S

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CAP SCREWDRIVER      MSN-I15S28525S

---



DUAL LEAD MIS SCREWDRIVER      MSN-I25S24520S

---



GUIDE WIRE TROCAR      MSN-KONT00500S

---



COUNTER TORQUE HANDLE      MSN-H25S00000S

---



TAP 4.5MM      MSN-J05S00045S

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TAP 5.5MM      MSN-J05S00055S

---



TAP 6.5MM      MSN-J05S00065S

---



TAP 7.5MM      MSN-J05S00075S

---



TAP 8.5MM      MSN-J05S00085S

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**INSTRUMENTS**

RATCHETING HANDLE MSN-H05S00100S

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TULIP ALIGNMENT MSN-K05S00055S

---



RATCHETING T HANDLE MSN-H15S00100S

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DINAMOMETRIC T HANDLE 9Nm MSN-H15S00090S

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MIS ROD HOLDER MSN-D15S00000

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DILATOR N.1 MSN-L05S20002S

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DILATOR N.2 MSN-L25S14409S

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DILATOR N.3 MSN-L25S11514S

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MIS ROD PUSHER MSN-P15S00001S

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MIS TROCAR MSN-A15S02922S

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**INSTRUMENTS**

CAP HOLDER

MSN-I2SS24520S



REAMING AWL

MSN-A1SS13507S



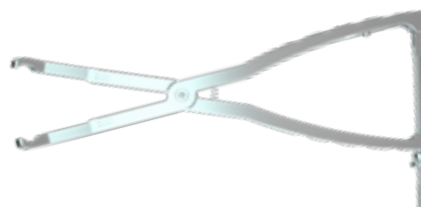
MIS CALIPER

MSN-M1SS00000S



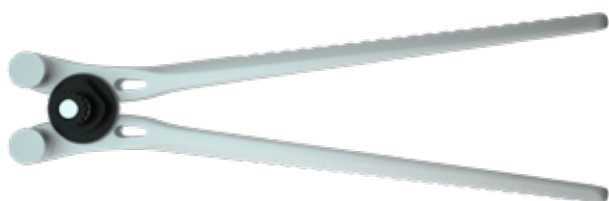
MIS COMPRESSOR

MSN-N0SS00002S



ROD BENDER

MSN-F0SS00000S



PIPE CLEANER

MSN-J2SS00000S



TISSUE DISSECTOR

MSN-T0SS00000S



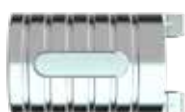
MIS GAUGE

MSN-K3SS00138S



SLIDING RING

MSN-K2SS00025S



SUPERIOR RING

MSN-K2SS00015S



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**INSTRUMENTS**

PIVOT 1

MSN-Z15S000015



PIVOT 2

MSN-Z15S000025



SCREW TAB REMOVER

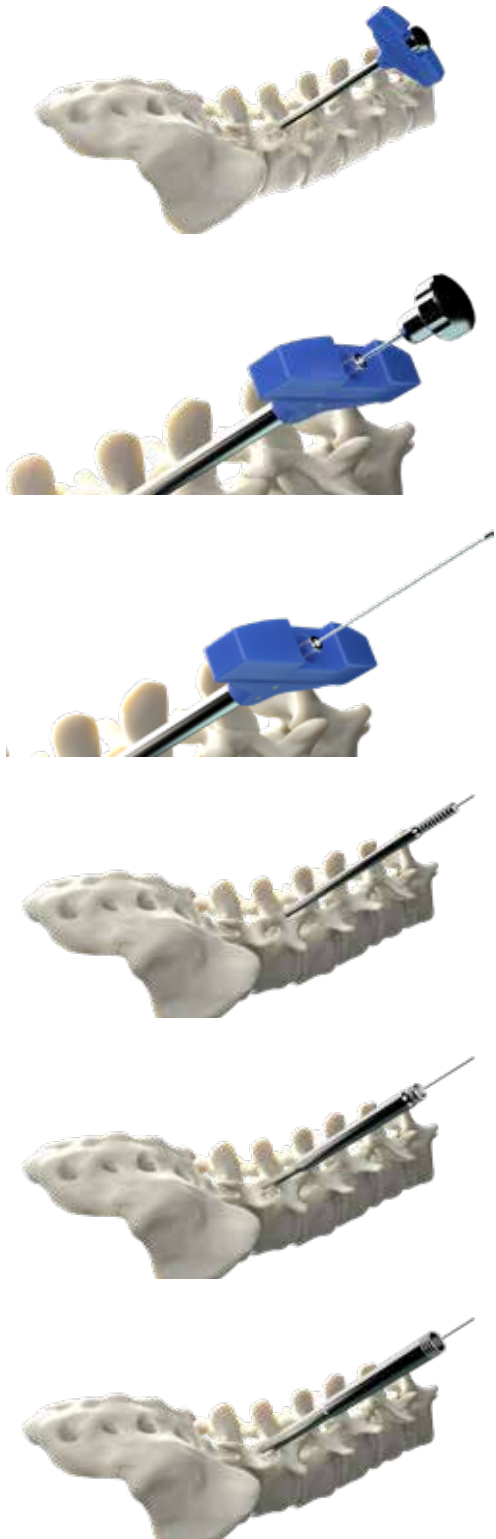
MSN-Z25S000025





## MIS SURGICAL TECHNIQUE

1 —



### Preparation of the pedicle

After locating the access point, position the **trocar** and through radiographic control proceed to the inside of the pedicle.

Once the appropriate depth has been reached remove the core and handle, and insert the **guide wire** ensuring that it intercepts the vertebral body to ensure minimum anchorage to the vertebral body.

Then remove the trocar making sure not to move the guide wire.

Continue with the insertion of **dilator tube no. 1** and then **dilator tube no. 2** and **dilator tube no. 3**, which, thanks to the toothed termination allows anchorage to the articular process to prevent unwanted translation or displacement during manoeuvres.

## MIS SURGICAL TECHNIQUE



Then remove **dilator tube No. 1**, checking that the guide wire remains in place, and should the operator wish to do so, prepare the screw housing with the **tapping tool**, which should be one size undersized in diameter from that of the screw you intend to place.

In case it is deemed appropriate, after removing **dilator tube No. 2** use the **reaming awl** to enable better positioning of the screw.

2 —



### Screw assembly

Next proceed to the assembly of the screw.

Hook the **MIS screwdriver** onto the **ratcheting handle**.

Next assemble the screw to the **screwdriver** by inserting it inside the tulip and turn the ferrule clockwise to make the final tightening.

## MIS SURGICAL TECHNIQUE

3 —



### Screw insertion

Proceed to insert the screw inside the stalk following the **guide wire** and tighten.

Then slide out the **screwdriver**, turning counterclockwise the ferrule previously used to tighten the screw, remove the **guide wire** and **dilator tube No. 3**.

Insert the **sliding ring** along the tulip of the screw to prevent premature breakage of the screw, and if deemed appropriate, also insert the **superior ring** to prevent the screws from interfering with each other during subsequent operations.

Repeat the same operations for the insertion of subsequent screws.

Opt. —



### Cementing

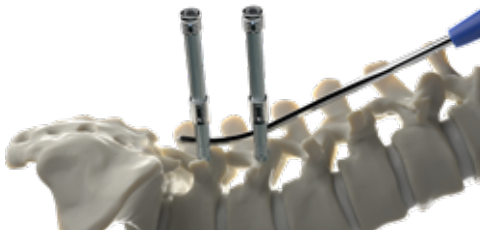
Connect the **cement needle adapter** by inserting its tip inside the screw, and then turn the guide ring clockwise to make the final tightening.

After checking that the two elements are firmly seated together, proceed to introduce the disposable bone filler to cement the screw.

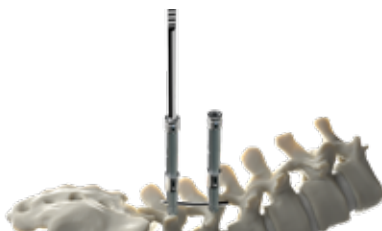
Before injecting the cement, make sure that the bone filler has come to rest against the screw stem.

## MIS SURGICAL TECHNIQUE

4 —



5 —



### Rod insertion

After positioning the screws, perform the measurement of the distance between them using appropriate **MIS caliper** in order to choose the appropriate bar.

Please note that the gauge shows the actual measurement between the screw heads, so it is recommended to insert a bar with a length at least 5 mm longer than that shown on the **MIS caliper**.

If it is considered appropriate, use the **tissue dissector** to create the necessary space for inserting the bar.

Connect the bar to the **MIS rod holder** by inserting the hexagonal part of the bar into the appropriate hole on the gauge and secure it to the gauge by turning the locking crown clockwise.

If necessary, the bar can be bent and shaped using the **bar bending pliers**.

Then insert the bar by passing inside the tulips previously aligned according to a hypothetical sagittal plane.

### Inserting the tightening nut

Using the **rod pusher** you can both check that the rod is seated correctly and push the rod down.

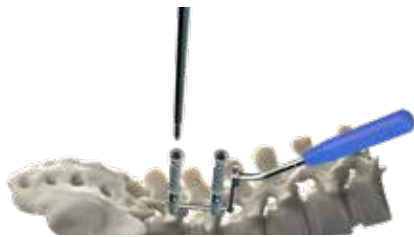
When you are certain that the bar has been properly seated in all screws, insert the nuts with the appropriate nut locators.

## MIS SURGICAL TECHNIQUE



Once the nuts are in place, attach the **ratcheting handle** to the **cap screwdriver** and tighten the locknuts until the rod is pushed into the tulips.

Once the rod is secured to the screws, pull the rings out of the tulips.



6 —



### Compression and distraction

Cover the tulips with **MIS gauge** and use **pivot 1** or **pivot 2** as the fulcrum of action in the center of the cannulas-after securing them to a handle.

To perform a compression, use the **MIS compressor** and compress below the **pivot**.

To perform a distraction, use the **MIS compressor** and compress above the **pivot**.



MIS SURGICAL TECHNIQUE

7 —

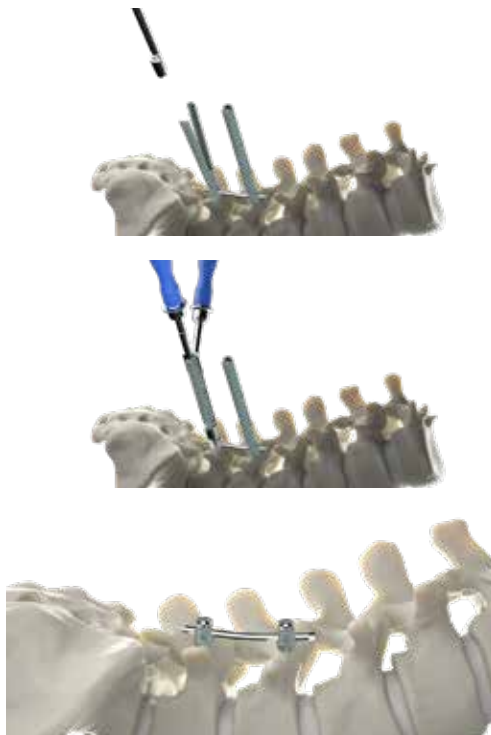


**Final tightening**

With the help of the **counter torque handle** connected to the **MIS gauge** make the final closure with the **9Nm dynamometric T-handle** assembled to the **cap screwdriver**.

Pull the **MIS gauge** out of the tulips and then unscrew the **rod holder** using the locking crown and then remove the gauge.

8 —



**Tulip removal**

Using the **screw tab removal** coupled with a **handle**, hook each individual tulip and then pry it loose from the screw cup.

To avoid displacements or small deformations of the system caused by the force required to break the tulips, a **counter torque** coupled with a handle can be used.



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**Clover Orthopedics s.r.l.**

Via Gadames n. 57/7, c.a.p. 20151 Milano

M. [info@cloverorthopedics.com](mailto:info@cloverorthopedics.com)

W. [cloverorthopedics.com](http://cloverorthopedics.com)

T. +39 02 457 902 31

F. +39 02 457 902 66

