

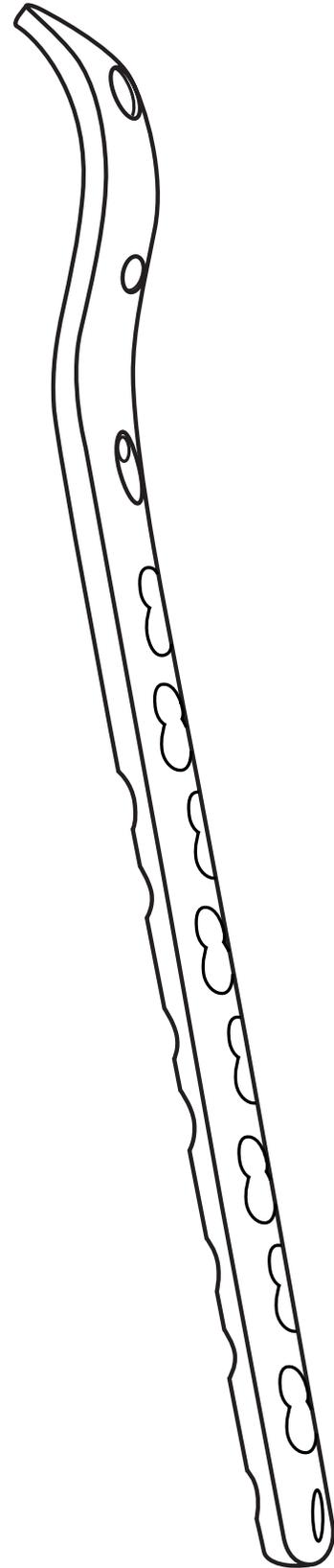
## SURGICAL TECHNIQUE

### ALP titanium proximal femur plate TLP



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## TECHNOLOGICAL ADVANTAGES

Traufix's blocking anatomical periarticular plate system offers the advantages of locking plates but also provides the flexibility and benefits of traditional plates, all in single system. Using both locking screws and cortical screws, the **TLP proximal femur plate** provides a sturdy mount, while acting as an effective support in reducing fracture.

The plate has in its shaft , combined holes that can work both dynamic compression and locking. This combination gives the surgeon the flexibility of axial compression and angular stability locking throughout the shaft of the plate. The condylar plates have many semesis; in addition, locking capability is important for fixed angle mounting in case of osteopenic bone or multifragmentary fractures, when the grip of the screws is lower. These screws do not rely on compression of the plate on the bone to withstand the patient's load, but work similar to multiple small angled plates.

## DESCRIPTION OF THE PLATES

- Anatomical premolding to fit the side face of the proximal femur.
- Plates specifically designed for the left or right femur, adapt to the corresponding anteroversion of the femoral neck.
- Plate length sufficient to cover the entire femoral diaphysis in segmental fractures.
- The possibility of using locking screws ensures the angular stability of the configuration regardless of the quality of the bone tissue.
- Possibility to apply tension to the plate to create a distributed load configuration.
- Left and right plates are available in titanium alloy (Ti6Al4V ELI).
- Plates with 6, 8, 10, 12 and up to 14, combined holes, which allow locking (in its threaded part) and cortical screws.

## SURGICAL INDICATIONS

The ALP 4.5/5.0/7.3 proximal femur plate is designed for femoral fractures, including:

1. Femoral fractures of the trochanteral region: simple trochanteral fractures, cervicotrochanteral, trochanterodiaphysary, multi-fragmentary pertrochanteral, intertrochanteral, inverted or transverse trochanters or with associated fracture of the medial cortical.
2. Proximal femur fractures associated with homolateral diaphysary femoral fracture.
3. Metastatic fractures of the proximal femur.
4. Proximal femur osteotomies.
5. Fixation in osteopenic bone and fixation of pseudoarthrosis and vicious fracture calluses.

## GENERAL CONTRAINDICATIONS

- Systemic inflammatory response syndrome (to be evaluated by the surgeon).
- Septicemia.
- Osteomyelitis.
- Patient unable to comply with post-operation care.
- Hypersensitivity to the materials (titanium).

## DESCRIPTION OF SURGICAL TECHNIQUE

### Pre-operation Planning

Complete the pre-operation X-ray assessment and develop the pre-operation plan. For a complete evaluation, AP and side x-rays of the entire femur are required. Traction x-rays and comparative images of the contralateral femur can be useful complements in this planning process.

If you plan to implant a proximal femur plate, determine the appropriate location of the three proximal screws.

Determine the length of the plate, the approximate length of the screws and the necessary instruments.

### Patient Placement

The patient should be placed in supine decubitus on a radiolucent operating room table, or on a traction table in case of low energy fractures. Before placing the surgical cloths, it is essential to check that the radiosopic display of the proximal femur is correct, both in lateral projection and anteroposterior.

### Reducing fracture and temporary fixation

Reduce fracture with the help of a traction table, tweezers, Schanz screws or other traditional reduction techniques. Another possibility is the indirect provisional reduction of the fracture by attaching the plate to the proximal segment with properly oriented screws, and then to the femoral diaphysis with the help of bone tweezers.

### Inserting guide needles and determining the trajectory of the proximal screws

Before placing the plate on the bone, screw the guide for k-wire  $\text{\O}2.0\text{mm}$  code 201.20 into the proximal hole of the plate, and two guides for k-wire  $\text{\O}1.6\text{mm}$  code 201.16 into the second and third locking holes (oblique). Threaded guides can also be used as handling elements to correctly place the plate on the proximal femur. (See image 1)

Using the AP and side projection fluoroscope, insert a  $\text{\O}2.0\text{mm}$  X 300mm threaded k-wire through the corresponding threaded guide into the first proximal hole and insert a  $\text{\O}1.6\text{mm}$  X 300mm threaded k-wire through the corresponding threaded guide into the second and third (oblique) proximal hole. For subsequent measurements of the screws to be correct, the k-wire must reach the subchondral bone without penetrating it. (See image 2).

### Caution

This technique is suggested to describe the use TRAUFIX instruments and implants, not aiming to interfere with the experience and decisions of the traumatologist considering his/her vast clinical and surgical experience to determine the best proposal for each particular patient.



Image 1

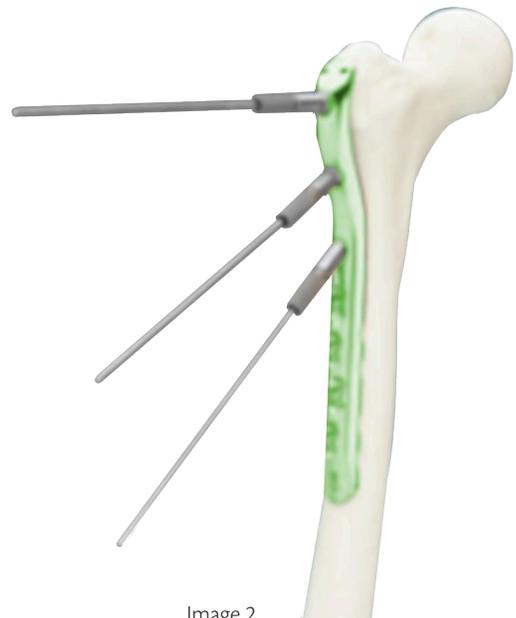


Image 2

**Note:** It is more important to place the guide needles correctly on the proximal femur (taking into account the desired placement for the screws) than to adapt in detail the contour of the plate to the anatomical features of the femur. The ability to lock the screws on the plate eliminates the need for the plate to be perfectly molded and to compress it onto the bone.

In AP projection, the proximal guide needle reaches the central part of the inferomedial quadrant of the femoral head, and its trajectory delimits an angle of 50 degrees with respect to femoral tracing. This guidance of the guide needle facilitates the subsequent insertion of the proximal locking screw forming a 95° angle to the longitudinal axis of the femoral diaphysis. (See image 3)

In lateral projection, the ideal placement of the guide needle is slightly after the center point. This accommodates an anteroversion position for the second guide needle (and the second locking screw). The exact orientation of the proximal guide needle (and therefore the proximal locking screw) ensures alignment on the front plane. (See image 4 and 5)

Before inserting another needle into the second threaded guide, test that the plate is properly aligned with reference to the proximal femur in the sagittal plane; both visual and radioscopic assessment is often necessary. This will prevent a deformity in previous apical extension when the plate is attached to the femoral diaphysis.

Once the alignment is confirmed to be satisfactory, insert the needles into the remaining two threaded guides, always under biplanar radioscopic control with the fluoroscope. In some fractures, the insertion of the third guide needle should be delayed until the final reduction of the fracture (and its compression, if possible) has been achieved. (See image 6)

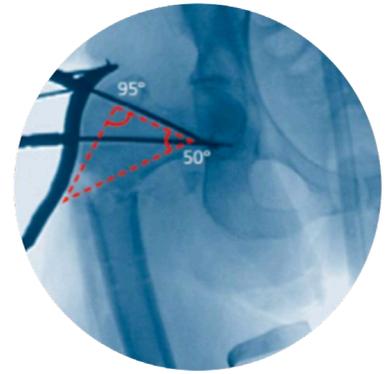


Image 3

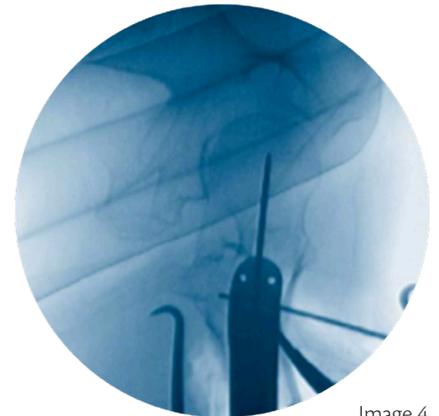


Image 4

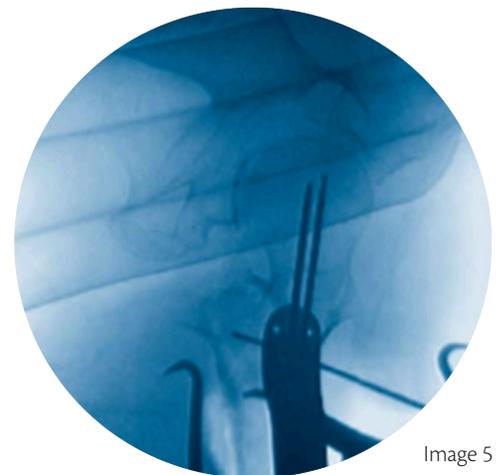


Image 5

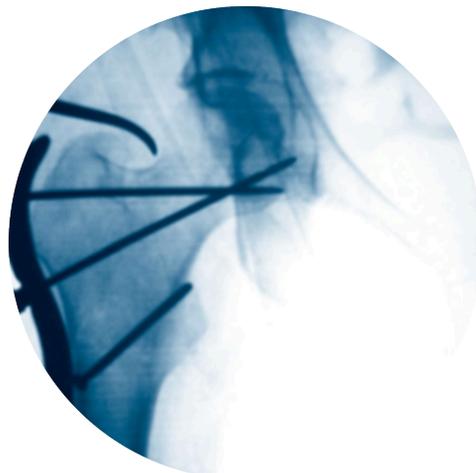


Image 6

### 7.3mm proximal screw insertion

Remove the guide for k-wire and use the depth meter to measure the length of the screw directly to the k-wire. Select the 7.3mm locking screw of the appropriate length. (See image 7)

Place drill guide code 128.50 and drill with  $\varnothing$  5.0mm cannulated drill bit.

**Tip:** In most cases, given the selftapping edges of the 7.3mm and 5.0mm screws, previous tapping is unnecessary.

Remove the drill guide and insert the locking screw under fluoroscopic control using the 4.0mm cannulated hex screwdriver. Once the screw is locked into the plate, the guide wire can be removed. (see image 8)

#### Important:

Double check that the screw is properly locked into the plate. If the screw head is not flush with the plate, this means that the screw is not fully locked.

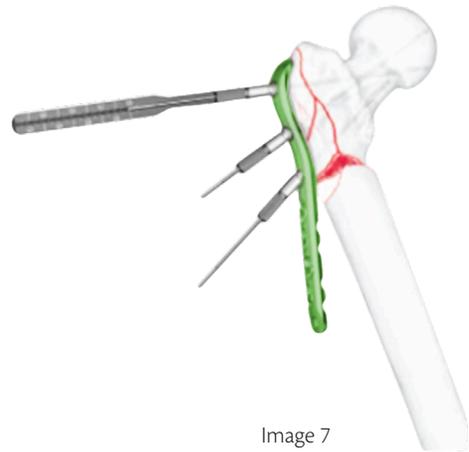


Image 7



Image 8

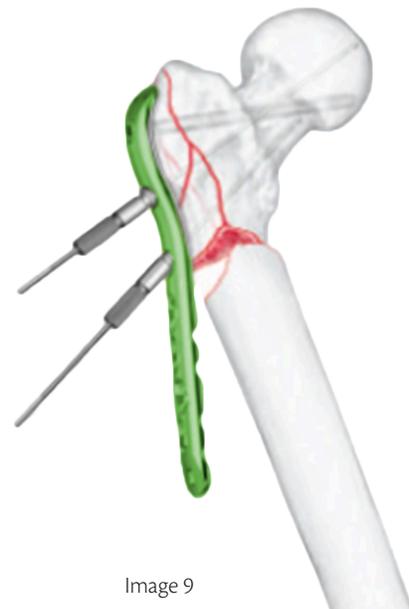


Image 9

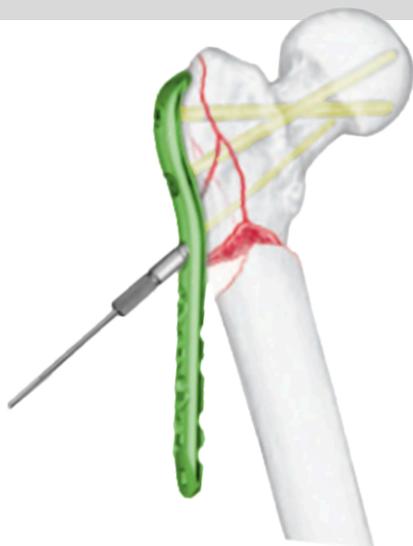


Image 10

### 5.0mm screw insertion

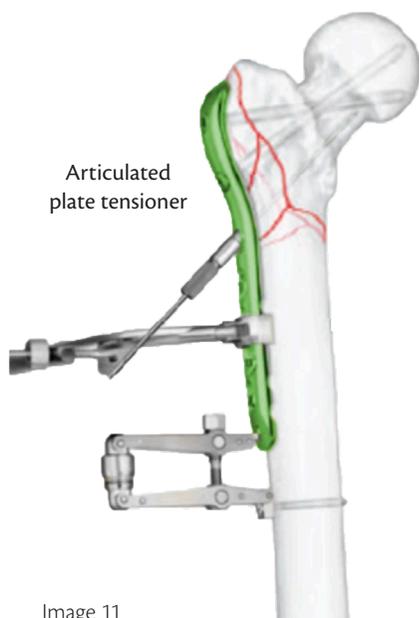
Remove the guide for k-wire and use the depth meter to measure the length of the screw directly to the k-wire. Select the 5.0mm locking screw of the appropriate length.

Place drill guide code 128.32 and drill with Ø 3.2mm cannulated drill bit.

**Tip:** In most cases, given the selftapping edges of the 5.0mm screws, previous tapping is unnecessary.

Remove the drill guide and insert the locking screw under fluoroscopic control using the 3.5mm cannulated hex screwdriver. Once the screw is locked into the plate, the guide wire can be removed. (see image 10)

**Important:** Double check that the screw is properly locked into the plate. If the screw head is not flush with the plate, this means that the screw is not fully locked.



Articulated plate tensioner

Image 11

### Approaching plate to femoral diaphysis

Attach the plate to the side face of the femoral diaphysis with the help of bone tweezers, adjusting the alignment on the horizontal plane (rotation) as appropriate. For the restoration of the length and reduction of the fracture you can make use of some of the indirect available resources to facilitate this task: traction table, articulated tensioner, large distractor, large distractor-compressor, large external fixer, etc. A prudent application of direct reduction techniques, which favor the protection of soft parts, may be desirable in some cases. (See image 11)

When the fracture type allows, it is recommended to apply a tensioner at the end of the plate to generate tension and compress the fracture.

### Inserting 4.5mm cortical screws

Pre-drill the bone with the 3.2mm drill bit through the universal drill guide. To drill in the pneumatic position, press down the drill guide into the non-threaded hole. For compression, place the drill guide at the end of the non-threaded hole further away from the fracture line. Do not press down on the spring-loaded tip of the drill guide. (See image 12)

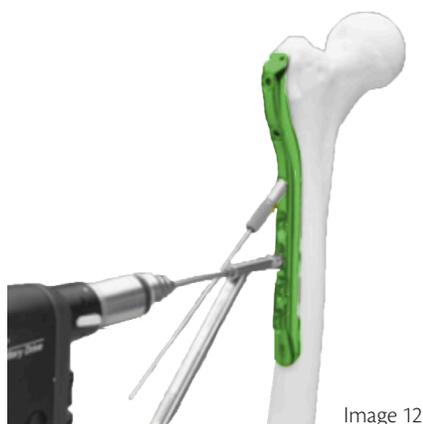


Image 12

**Note:** All 4.5mm cortical screws must be inserted into the plate shaft before inserting any locking screws into the plate shaft.

Determine the screw length using the depth meter. (See image 13) Select and insert the 4.5mm cortical screw of the appropriate length, using the large hex screwdriver. Insert as many 4.5mm cortical screws into the plate shaft as needed. (See image 14)

### Inserting 5.0mm locking screws

Screw the drill guide (128.32) on the threaded part of one of the combined holes in the plate shaft.

Proceed to drill the bone with bit 3.2 to the desired depth. The proper length of the screw can be determined by directly reading the drilling depth in the laser mark of the bit or with the help of the depth meter. (See image 15)

Insert a 5.0mm locking screw of the appropriate length into the femur manually with a handle and torque limiter. A click will indicate that the optimal torque moment has been reached.

**Note:** It is essential to use a drill guide. This makes it possible to center the bit on the threaded part of the combined hole to create a drilling path capable of ensuring proper screw locking on the plate. (See image 16)

The bone holes for the locking screws can be drilled unicortically or bicortically, depending on the quality of the bone. Repeat to insert the remaining locking screws.



Image 13

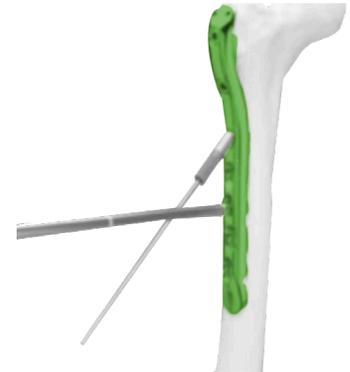


Image 14



Image 15

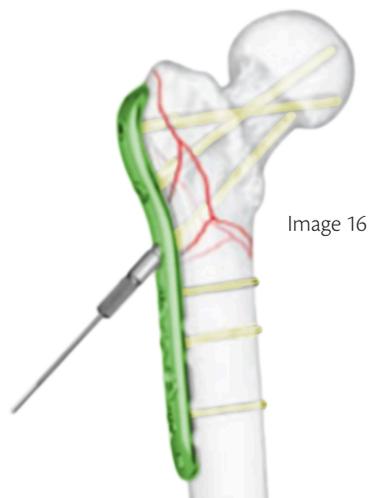


Image 16

### Inserting the 5.0mm oblique locking screw

Remove the wire guide previously placed in the oblique hole of the plate to measure the appropriate screw length using the depth meter directly on the k-wire. (see image 17)

Screw Length Considerations: The 5.0mm oblique locking screw must converge 95° with the 7.3mm proximal screw to create an arbotant that offers additional stability. To achieve this convergence, the oblique locking screw must be 85mm long.

Place the drill guide code 128.32 and drill with the Ø3.2mm cannulated drill bit.

Remove the drill guide and insert the 5.0mm cannulated screw using the 3.5mm cannulated hexagonal screwdriver under radioscopic control. Once the screw is locked in the plate, the guide wire can be removed. (see image 18)

#### Notes:

- The need to insert this screw depends on the type of fracture, and should be determined during pre-operation planning.
- Before closing the surgical field, tighten all locking screws tightly.

#### Tips

Cleaning the cannulation of all instruments is essential for proper operation. Instruments should be cleaned intraoperation with the cleaning needle to prevent the accumulation of residues in the cannulation so that the instruments can be locked when inserted into the guide needle. After surgery, the instruments should be cleaned with the needle and cleaning brush.

### Implant removal

The decision to remove the implant is up to the treating physician. It is recommended to remove the implant once the consolidation process is complete, provided that it is feasible and suitable for the patient. To remove the screws, first clear the screw head by removing the tissues they have been able to penetrate the hexagonal inlet to ensure that the screwdriver enters properly and reduce the risk of damage to it that prevents it from being removed. Unscrew all screws and remove them and then remove the plate.



Image 17



Image 18

## IMPLANTS AND INSTRUMENTS

### PLATES

#### ALP TITANIUM PROXIMAL FEMUR PLATE TLP RIGHT

- 150.04 ALP titanium proximal femur plate TLP 4 holes right
- 150.06 ALP titanium proximal femur plate TLP 6 holes right
- 150.08 ALP titanium proximal femur plate TLP 8 holes right
- 150.10 ALP titanium proximal femur plate TLP 10 holes right
- 150.12 ALP titanium proximal femur plate TLP 12 holes right
- 150.14 ALP titanium proximal femur plate TLP 14 holes right

#### ALP TITANIUM PROXIMAL FEMUR PLATE TLP LEFT

- 151.04 ALP titanium proximal femur plate TLP 4 holes left
- 151.06 ALP titanium proximal femur plate TLP 6 holes left
- 151.08 ALP titanium proximal femur plate TLP 8 holes left
- 151.10 ALP titanium proximal femur plate TLP 10 holes left
- 151.12 ALP titanium proximal femur plate TLP 12 holes left
- 151.14 ALP titanium proximal femur plate TLP 14 holes left

### SCREWS

#### 5.0mm TITANIUM CORTEX LOCKING SCREW

- 108.20 5.0mm titanium cortex locking screw 20mm
- 108.22 5.0mm titanium cortex locking screw 22mm
- 108.24 5.0mm titanium cortex locking screw 24mm
- 108.26 5.0mm titanium cortex locking screw 26mm
- 108.28 5.0mm titanium cortex locking screw 28mm
- 108.30 5.0mm titanium cortex locking screw 30mm
- 108.32 5.0mm titanium cortex locking screw 32mm
- 108.34 5.0mm titanium cortex locking screw 34mm
- 108.36 5.0mm titanium cortex locking screw 36mm
- 108.38 5.0mm titanium cortex locking screw 38mm
- 108.40 5.0mm titanium cortex locking screw 40mm
- 108.42 5.0mm titanium cortex locking screw 42mm
- 108.44 5.0mm titanium cortex locking screw 44mm
- 108.46 5.0mm titanium cortex locking screw 46mm
- 108.48 5.0mm titanium cortex locking screw 48mm

- 108.50 5.0mm titanium cortex locking screw 50mm
- 108.55 5.0mm titanium cortex locking screw 55mm
- 108.60 5.0mm titanium cortex locking screw 60mm
- 108.65 5.0mm titanium cortex locking screw 65mm
- 108.70 5.0mm titanium cortex locking screw 70mm

#### **4.5mm TITANIUM CORTEX SCREW**

- 126.12 4.5mm titanium cortex screw 12mm
- 126.14 4.5mm titanium cortex screw 14mm
- 126.16 4.5mm titanium cortex screw 16mm
- 126.18 4.5mm titanium cortex screw 18mm
- 126.20 4.5mm titanium cortex screw 20mm
- 126.22 4.5mm titanium cortex screw 22mm
- 126.24 4.5mm titanium cortex screw 24mm
- 126.26 4.5mm titanium cortex screw 26mm
- 126.28 4.5mm titanium cortex screw 28mm
- 126.30 4.5mm titanium cortex screw 30mm
- 126.32 4.5mm titanium cortex screw 32mm
- 126.34 4.5mm titanium cortex screw 34mm
- 126.36 4.5mm titanium cortex screw 36mm
- 126.38 4.5mm titanium cortex screw 38mm
- 126.40 4.5mm titanium cortex screw 40mm
- 126.45 4.5mm titanium cortex screw 45mm
- 126.50 4.5mm titanium cortex screw 50mm
- 126.55 4.5mm titanium cortex screw 55mm
- 126.60 4.5mm titanium cortex screw 60mm
- 126.65 4.5mm titanium cortex screw 65mm
- 126.70 4.5mm titanium cortex screw 70mm

**5.5mm TITANIUM CANCELLOUS LOCKING SCREW**

- 109.40 5.5mm titanium cancellous locking screw 40mm
- 109.45 5.5mm titanium cancellous locking screw 45mm
- 109.50 5.5mm titanium cancellous locking screw 50mm
- 109.55 5.5mm titanium cancellous locking screw 55mm
- 109.60 5.5mm titanium cancellous locking screw 60mm
- 109.65 5.5mm titanium cancellous locking screw 65mm
- 109.70 5.5mm titanium cancellous locking screw 70mm
- 109.75 5.5mm titanium cancellous locking screw 75mm
- 109.80 5.5mm titanium cancellous locking screw 80mm
- 109.85 5.5mm titanium cancellous locking screw 85mm
- 109.90 5.5mm titanium cancellous locking screw 90mm

**7.3mm TITANIUM CANNULATED CANCELLOUS LOCKING SCREW**

- 156.45 7.3mm titanium cannulated cancellous locking screw 45mm
- 156.50 7.3mm titanium cannulated cancellous locking screw 50mm
- 156.55 7.3mm titanium cannulated cancellous locking screw 55mm
- 156.60 7.3mm titanium cannulated cancellous locking screw 60mm
- 156.65 7.3mm titanium cannulated cancellous locking screw 65mm
- 156.70 7.3mm titanium cannulated cancellous locking screw 70mm
- 156.75 7.3mm titanium cannulated cancellous locking screw 75mm
- 156.80 7.3mm titanium cannulated cancellous locking screw 80mm
- 156.85 7.3mm titanium cannulated cancellous locking screw 85mm
- 156.90 7.3mm titanium cannulated cancellous locking screw 90mm
- 156.95 7.3mm titanium cannulated cancellous locking screw 95mm
- 156.100 7.3mm titanium cannulated cancellous locking screw 100mm
- 156.105 7.3mm titanium cannulated cancellous locking screw 105mm
- 156.110 7.3mm titanium cannulated cancellous locking screw 110mm

## 5.0mm TITANIUM CANNULATED CORTEX LOCKING SCREW

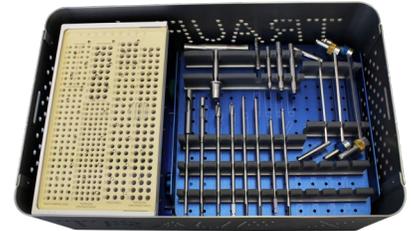
- 171.20 5.0mm titanium cannulated cortex locking screw 20mm
- 171.22 5.0mm titanium cannulated cortex locking screw 22mm
- 171.24 5.0mm titanium cannulated cortex locking screw 24mm
- 171.26 5.0mm titanium cannulated cortex locking screw 26mm
- 171.28 5.0mm titanium cannulated cortex locking screw 28mm
- 171.30 5.0mm titanium cannulated cortex locking screw 30mm
- 171.32 5.0mm titanium cannulated cortex locking screw 32mm
- 171.34 5.0mm titanium cannulated cortex locking screw 34mm
- 171.36 5.0mm titanium cannulated cortex locking screw 36mm
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- 171.42 5.0mm titanium cannulated cortex locking screw 42mm
- 171.44 5.0mm titanium cannulated cortex locking screw 44mm
- 171.46 5.0mm titanium cannulated cortex locking screw 46mm
- 171.48 5.0mm titanium cannulated cortex locking screw 48mm
- 171.50 5.0mm titanium cannulated cortex locking screw 50mm
- 171.55 5.0mm titanium cannulated cortex locking screw 55mm
- 171.60 5.0mm titanium cannulated cortex locking screw 60mm
- 171.65 5.0mm titanium cannulated cortex locking screw 65mm
- 171.70 5.0mm titanium cannulated cortex locking screw 70mm
- 171.75 5.0mm titanium cannulated cortex locking screw 75mm
- 171.80 5.0mm titanium cannulated cortex locking screw 80mm
- 171.85 5.0mm titanium cannulated cortex locking screw 85mm
- 171.90 5.0mm titanium cannulated cortex locking screw 90mm
- 171.95 5.0mm titanium cannulated cortex locking screw 95mm

## INSTRUMENTS

The following instruments are designed to anchor only on Traufix implants, the use of instruments from other brands may damage the product and not anchor properly.

CODE	DESCRIPTION
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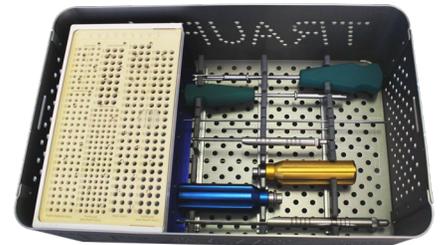
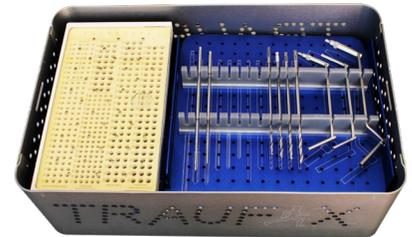
128.32	Drill guide for 3.2mm drill bit
128.50	Drill guide for 5.0mm drill bit
201.16	Guide for 1.6mm K-wire
201.20	Guide for 2.0mm K-wire



Other generic instruments needed:

QTY.	DESCRIPTION
------	-------------

2	Threaded K-wire 1.6mm
2	Threaded K-wire 2.0mm
1	Eccentric neutral drill guide 3.2
1	Double drill guide 4.5 / 6.5
1	Double drill guide 3.2 / 4.5
1	Handle with torque wrench ao 4.0 Nm
1	T-handle with quick coupling (AO)
1	Depth meter stainless steel 90mm
1	Screwdriver tip AO hex 3.5mm
1	Screw extractor tip hex 3.5mm
1	Reamer tip (hole punch) for large fragments 8.5mm
1	Depth meter for guide K-wire
1	Cannulated drill bit Ø3.2mm
1	Cannulated drill bit Ø5.0mm
1	Cannulated hexagonal screwdriver 3.5mm
1	Cannulated hexagonal screwdriver 4.0mm
1	Self-centering pliers 26cm long
1	Medium field forceps 19mm
1	Multi-toothed forceps 22cm
1	Periosteal elevator 9mm





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