SURGICAL TECHNIQUE

ALP titanium distal femur plate CONDYFIX

TRAUFIX
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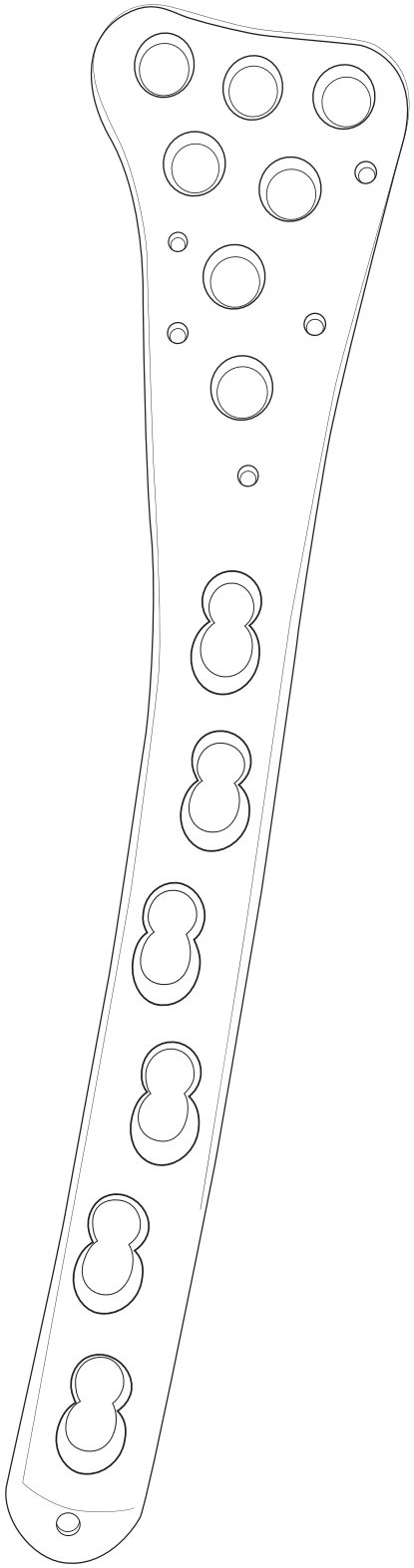


TECHNOLOGICAL ADVANTAGES

The Traufix's ALP titanium distal femur plate CONDYFIX block anatomical periarticular plate system offers the advantages of locking plates, but they also provide the flexibility and benefits of traditional plates, all in one system. Using both, locking screws and cortex screws, the CONDYFIX plate provides a sturdy mount, while acting as an effective support in reducing fracture.

The plate has in its shaft combined holes that can function as dynamic compression and as a locking. This combination gives the surgeon the flexibility of axial pressure and angular stability locking throughout the shaft.

Condylar plates have many similarities to traditional methods of osteosynthesis with plates, but offer some important improvements, such as the use of locking screws, which allows to create a fixed angle assembly using well-known osteosynthesis techniques; 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 similarly to multiple small angled plates.

DESCRIPTION OF THE PLATES

- Better fixation of osteopenic bone and multifragmentary fractures as a result of the use of locking screws.
- Pre-molded and flat-profile plates.
- Plates are available left and right in titanium alloy (Ti6Al4V ELI).
- Head of anatomical design, pre-molded to fit the distal femur, which makes the intraopebodyration molding of the plate unnecessary.
- Combined holes that can function as dynamic pressure and locking.
- Plates with 6, 8, 10, 12 and up to 14 holes combined in the plate, to adapt to different types of fractures (including diaphyseal fractures in combination with joint fragments).
- Curved plates are pre-molded to fit the anterior curving of the side face of the femur.

SURGICAL INDICATIONS

It is recommended to use the CONDYFIX distal femur ALP plate in the following cases:

1. Strengthening multifragmentary fractures of the distal femur.
2. Supracondylar fractures.
3. Intra-articular and extra-articular condylar fractures.
4. Vicious pseudoarthrosis and fracture calluses in the distal femur.
5. Supracondylar fractures.
6. Fixation in osteopenic bone.

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.

Patient Placement

The patient should be placed in supine decubitus on a radio- transparent table. Radioscopic visualization of the distal femur, both in lateral and anteroposterior projection, is essential.

Reducing the joint surface

Temporarily reduce and secure joint fragments using Kirschner needle or tip reduction clamps.

Secure the femoral condyles with 6.5mm cancellous screws properly placed. You can hold the condyle plate sideways over the femoral condyle to select a screw insertion zone that does not interfere afterwards with the placement of the plate.

Kirschner needles inserted into the fragments can be used as a reduction lever, as well as to achieve a temporary fixation of the fracture. It is important to check that Kirschner needles do not interfere with proper plate placement.

To secure a rear joint fragment, insert **3.5mm** cortex screws or **4.0mm** cancellous screws anteroposterior and countersink the head of the screws so that they fall below the level of the joint cartilage. Sometimes it may be necessary to reposition one of these screws to avoid spatial interference with some screw considered essential for fixing the plate.

Caution

This technique is suggested to describe the use of the 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.

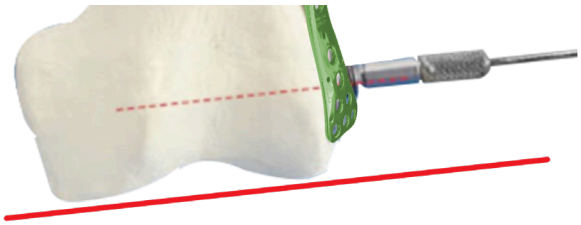


Image 1 **Knee joint axis**

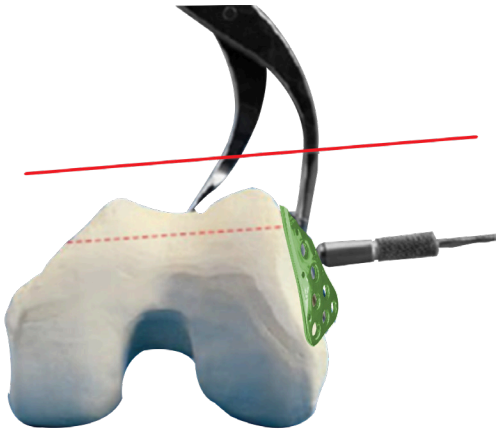


Image 2 **Trochlear surface of the fear-patellar joint**

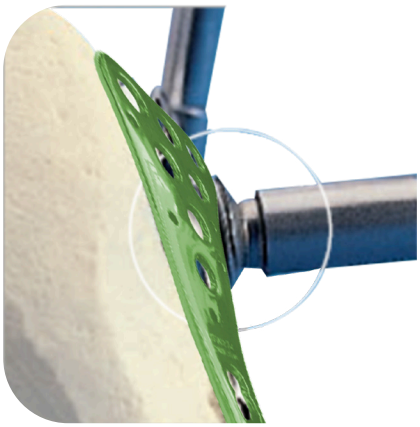


Image 3

Determining the position of the plate

Insert a Kirschner needle through the femoral condyles at knee height to indicate the axis of the joint. (See image 1)

Insert a second Kirschner needle through the femororrotullian joint on the troclear surface. (See image 2)

Before placing the plate on the bone screw at least two threaded guides into the peripheral holes of the plate head. Use threaded guides as handling elements to place the plate on the bone. (See image 3)

Note: Even when the threaded guide is fully seated, some of its threads stand out from the plate surface.
With the help of anatomical references and fluoroscope, place the condyle plate on the intact or reconstructed femoral condyle, without attempting to reduce the proximal part of the fracture.

Notes:

- It is easier to screw the threaded guides onto the plate before placing it on the bone.
- The use of the threaded guide is mandatory to properly lock the screws onto the plate.

If necessary, reset the position of the plate, and insert a guide needle to prevent the plate from rotating. This second guide needle ensures the temporary fixation of the plate to the femoral condyle. (See image 4)

Note: Although any hole in the plate head can be used, the recommended position for the second guide needle is located in the most distal anterior hole.

The guide needle must be inserted through the threaded guide.
It is recommended that before proceeding, check by clinical examination and with the help of the fluoroscope that the plate head is positioned correctly. This will help check that:

- The guide needle inserted through the central hole is located parallel to both the distal femoral joint shaft and the femororro tulian joint.
- Guide needles inserted through any of the peripheral holes in the plate head are parallel to the femoral joint shaft.

- The plate is properly oriented on the femoral condyle in lateral projection. Since the femoral diaphysis is often misaligned in relation to the distal fragment, the correct placement of the plate can be determined by orienting the distal silhouette of the plate to the anatomical silhouette of the condyle. The placement of the plate on the condyle at this time of intervention will determine the definitive reduction in bending and extension.

Note: Note that the most distal hole and rear **5.0mm** screws may be in the distal position in reference to the Blumensaat line, and require a unicondylar screw.

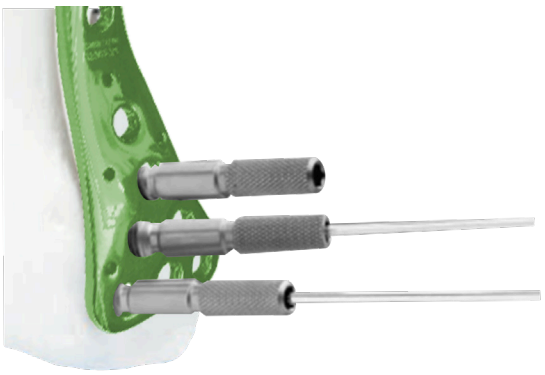


Image 4

Inserting the screws (5.5mm and 5.0mm)

Secure the position of the plate on the external femoral condyle with at least three guide needles before inserting the first screw. Although screws can be inserted in any order, it is usually best to start with the 5.5mm center screw.

Insert the guide needle until it reaches the medial wall of the femoral condyle. Determine the appropriate screw length using the depth meter. For the measurement to be correct, the depth meter must be in contact with the end of the threaded guide; This ensures that the screw tip is at the same height where the guide needle tip is now located or a depth meter can be used to determine the size of the screw to be used. (See image 5)

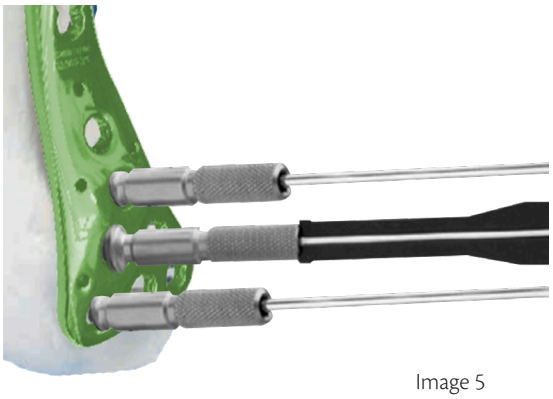


Image 5

Screw a drill guide (128.40) to the locking and drill with the 4.0mm drill bit. Remove the guides and insert a screw of the appropriate length into the bone, using the hexagonal screwdriver. Locking screws can be inserted with the help of a surgical motor, but this device should not be used to perform the final tightening, as the thread may be damaged. (See image 6)

Tighten all locking screws tightly to lock them on the plate.

Notes:

- If necessary, the reduction of a fragment with a traction screw must be carried out before inserting the locking screws into that fragment.
- If the plate moves during the screw insertion process, remove the guide needles and reinsert them so that the screws lock properly on the plate.
- To compress the plate onto the external femoral condyle, it is necessary to insert a cortex screw before any of the locking screws. Once the reduction is complete, the cortex screws can be replaced by locking screws.

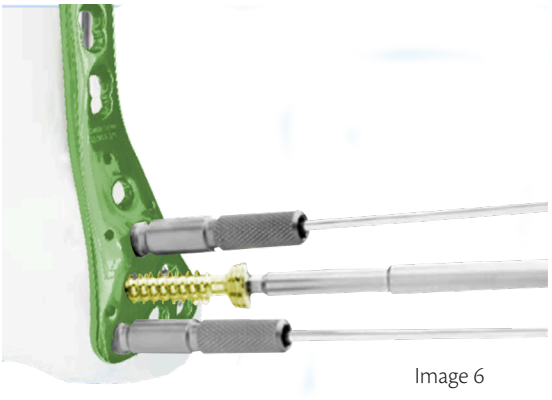


Image 6

Note: With the fully seated **5.5mm** locking screw, some of its threads still stand out from the plate surface.

Reducing condyles in reference to femoral diaphysis

Reduce plate on proximal femoral diaphysis. Check the rotation of the limb by physical examination and the anatomical characteristics of the fracture type.

Temporarily attach the plate to the femur with bone clamps.

Once the fracture is successfully reduced, and if the fracture type allows, tension can be applied to the plate with the help of the articulated tensioner.

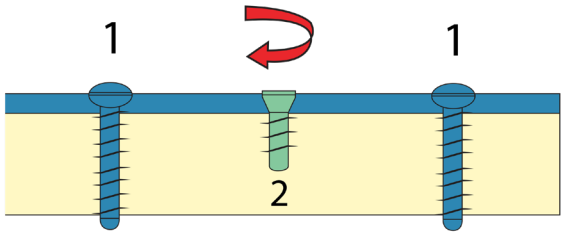


Image 7 Correct

Note: In multifragmentary fractures, it is not always possible to obtain full anatomical reduction of the fracture.
In simple fractures, the use of articulated plate tensioner can facilitate anatomical reduction of fracturing fragments; this instrument generates both compression and distraction.
In addition to locking threaded holes, the CONDIFYX plate works similarly to a dynamic compression plate; therefore, a combination of traction screws and locking screws can be used.

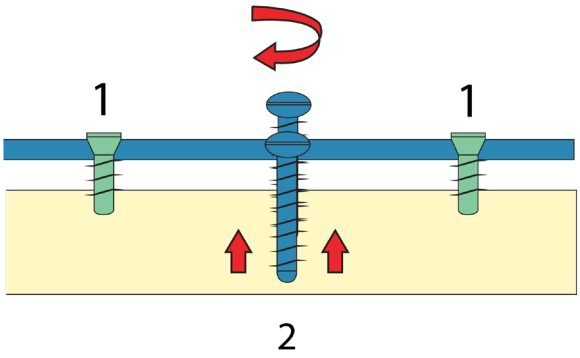


Image 8 Incorrect

Important

- If cortex screws (1) and locking screws (2) are combined, a cortex screw must first be inserted to approximate the plate to the bone. (See image 7)
- If locking screws (1) have already been inserted to secure the plate to a fragment, it is not recommended to then insert a cortex screw (2) into the same fragment without having loosened and tightened the locking screws again before. (See image 8)

Inserting 4.5mm cortex screws

Insert as many **4.5mm** cortex screws into the proximal part of the plate as needed.

Important:

- All **4.5mm** cortex screws must be inserted before inserting the locking screws.

Perform a previous bicortical perforation of the bone with the **3.5mm** drill bit through the universal drill guide. (See image 9)

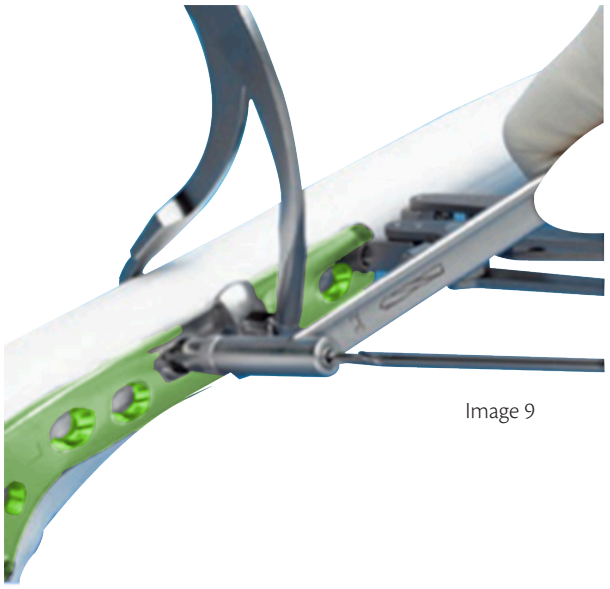


Image 9

To drill in a neutral 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 10)

Image 10

Determine the screw length using the depth meter. Select and insert the **4.5mm** cortex screw of the appropriate length, using the large hex screwdriver. (See image 11)

Image 11

Inserting 5.0mm locking screws

Mount the drill guide (128.32) to the threaded part of one of the combined holes in the shaft.

Proceed to pierce the bone with the drill bit 3.2mm. Remove the drill guide. 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 12)

Image 12

Place the screws with the help of a torque adapter. A click will indicate that the optimal torque moment has been reached.
Repeat to insert the remaining locking screws.

Note: The use of the drill guide is mandatory to correctly lock the screws on the plate.

Examine the intervened limb both clinically and radiologically. It is important that femoral condyles are oriented correctly with respect to femoral diaphysis. Tighten all distal locking screws tightly before closing the surgical field.

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.

IMPLANTS AND INSTRUMENTS

PLATES

ALP TITANIUM DISTAL FEMUR PLATE CONDYFIX RIGHT

119.06 ALP titanium distal femur plate CONDYFIX 6 holes right
119.08 ALP titanium distal femur plate CONDYFIX 8 holes right
119.10 ALP titanium distal femur plate CONDYFIX 10 holes right
119.12 ALP titanium distal femur plate CONDYFIX 12 holes right
119.14 ALP titanium distal femur plate CONDYFIX 14 holes right

ALP TITANIUM DISTAL FEMUR PLATE CONDYFIX LEFT

120.06 ALP titanium distal femur plate CONDYFIX 6 holes left
120.08 ALP titanium distal femur plate CONDYFIX 8 holes left
120.10 ALP titanium distal femur plate CONDYFIX 10 holes left
120.12 ALP titanium distal femur plate CONDYFIX 12 holes left
120.14 ALP titanium distal femur plate CONDYFIX 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

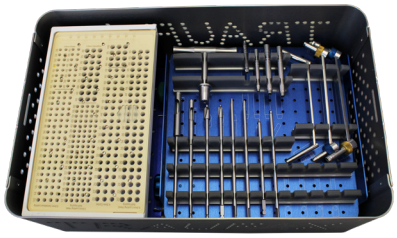
5.5mm TITANIUM CANCELLOUS LOCKING SCREW

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

INSTRUMENTS

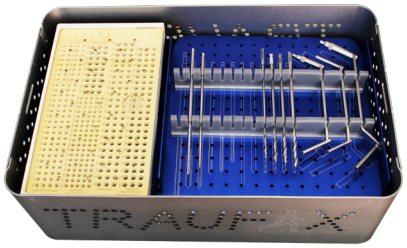
The following instruments are designed to anchor only on Traufix implants, the use of instruments from other brands may damage the product and not anchor properly.

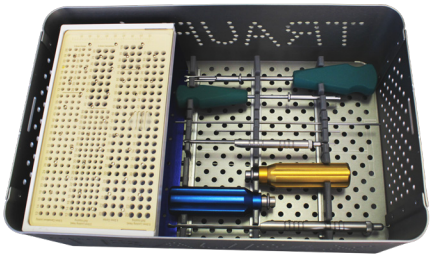
CODE	DESCRIPTION
128.32	Drill guide for 3.2mm drill bit
128.40	Drill guide for 4.0mm drill bit



Other generic instruments needed:

QTY.	DESCRIPTION
2	2.0mm threaded guide-wire
2	1.5mm threaded guide-wire
1	3.5mm hexagonal screwdriver for 4.5mm/6.5mm screw
1	3.2mm eccentric neutral drill guide
1	4.5mm/6.5mm double drill guide
1	3.2mm/4.5mm double drill guide
1	Torque wrench AO of 4.0Nm
1	T-handle with quick coupling (AO)
1	90mm depth gauge
1	8mm countersink tip for 4.5mm/6.5mm screw
1	3.5mm screwdriver hexagonal tip
1	3.5mm hexagonal screw extractor tip
1	8.5mm reamer tip for large fragments
1	4.5mm tap tip
1	3.2mm drill bit quick coupling
1	3.5mm drill bit quick coupling
1	4.0mm drill bit quick coupling





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