

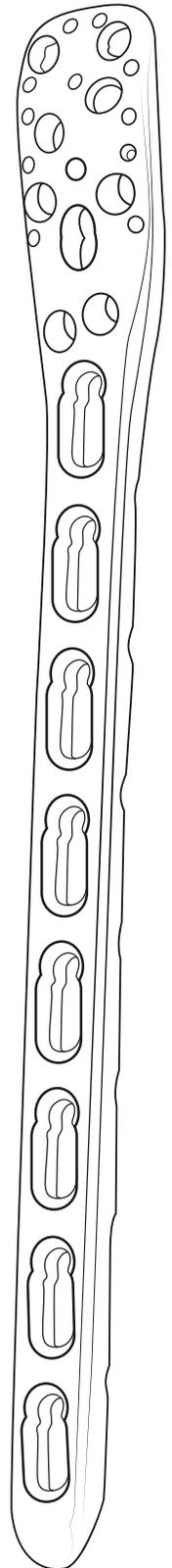
SURGICAL TECHNIQUE

ALP titanium humerus plate
PROH-LOCK and PROH-LOCK LARGE



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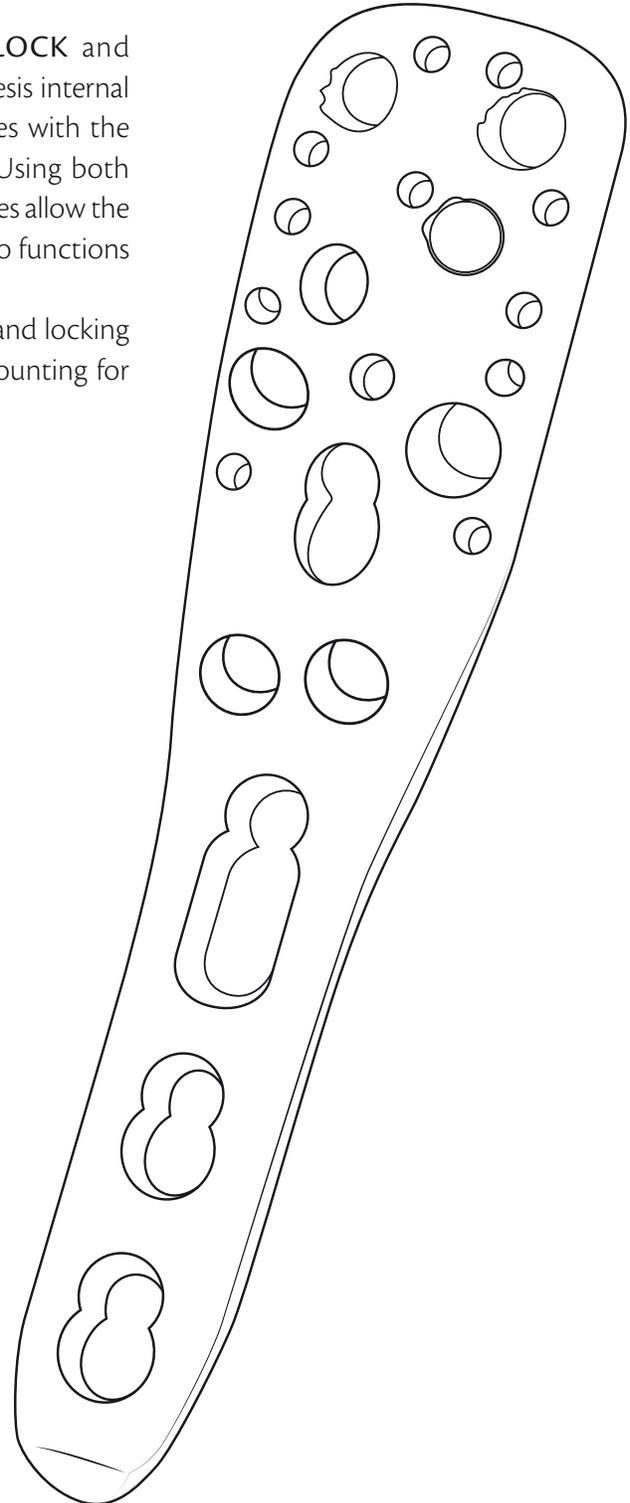
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TECHNOLOGICAL ADVANTAGES

The Traufix's ALP titanium humerus plate **PROH-LOCK** and **PROH-LOCK LARGE**. The proximal humerus osteosynthesis internal fixation system combines the advantages of locked plates with the flexibility and benefits of traditional plates and screws. Using both locking and conventional screws, Traufix's PROH LOCK plates allow the creation of a structure that resists angular collapse and also functions as an effective fracture reduction aid.

The precise trajectory of the screws, anatomical contour and locking capability of proximal humerus plates provides stable mounting for the reconstruction of complex humerus fractures



DESCRIPTION OF THE PLATES

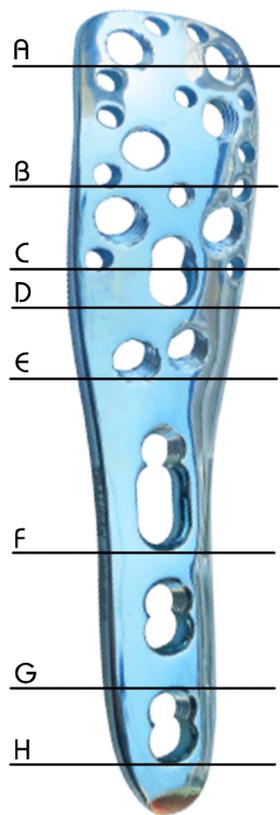
- Proximal suture holes or for temporary fixation with Kirschner wire to help maintain fracture reduction.
- The plates are available from titanium alloy (Ti6Al4V ELI).
- Rounded profile shaft.
- Proximal holes (Zone A – E) for 3.5mm locking screws that make possible a configuration with angular stability to increase grip in case of osteoporotic bone and multifragmentary fractures.
- Combined holes for the use of normal or locking screws.

PROH LOCK

- 3- and 5-hole plates.
- Optimal placement of the screws.
- Proximal suture holes to help maintain fracture reduction.

PROH LOCK LARGE

- 4, 6, 8, and 10 holes plates.
- Shaft reinforced to 3.7mm.
- Long distal locking holes for maximum adaptability.
- Plate length up to 234mm (approximately).



SURGICAL INDICATIONS

It is recommended to use the ALP titanium humerus plate in the following cases:

PROH LOCK

- Displaced fractures, bifragmentary, trifragmentary or quadrfragmentary fractures of the proximal humerus, also in case of osteopenic bone
- Proximal humerus pseudoarthrosis
- Proximal humerus osteotomies

PROH LOCK LARGE

The same indications as PROH LOCK, but it is also used for fractures that are prolonged by the diaphysis or fractures without medial support.

GENERAL CONTRAINDICATIONS

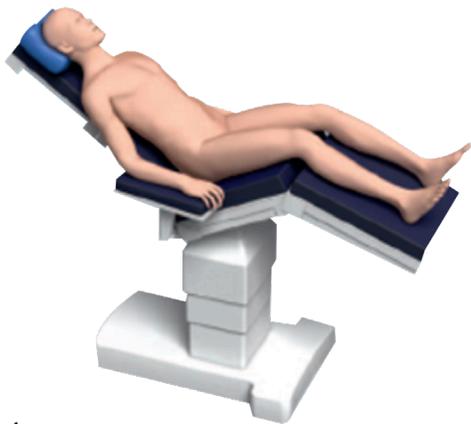
- Systemic inflammatory response syndrome (to be evaluated by the surgeon).
- Septicemia.
- Osteomyelitis.
- Patient unable to comply with post-operation care.
- Hypersensitivity to the materials (titanium).

DESCRIPTION OF THE SURGICAL TECHNIQUE

Pre-Operation Planning

It is strongly recommended that you complete the pre-operation radiographic evaluation before proceeding and develop the pre-operation plan in addition to determining the length of the plate and the position of the screws.

Patient Placement



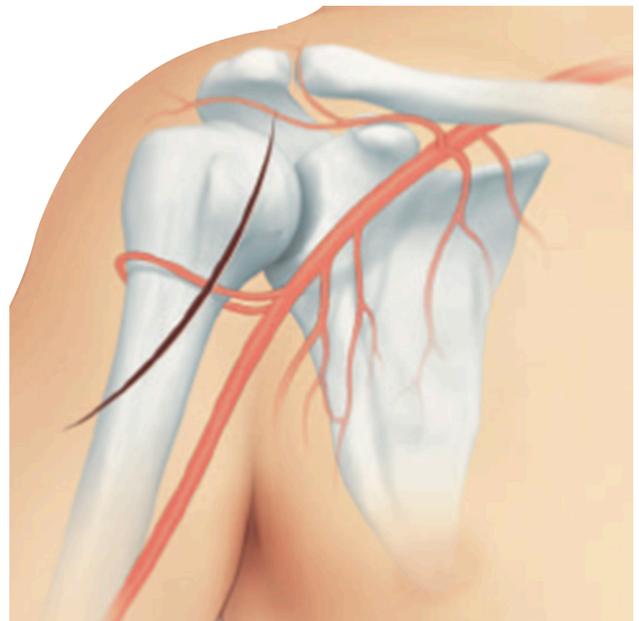
Caution

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.

Surgical Approach

A standard deltopectoral approach is recommended; initiate the incision in the skin at the midpoint between the coracoid and the collarbone, spreading it distally in an oblique way to the insertion of the deltoid. Divide the skin and subcutaneous tissues and identify the cephalic vein. The cephalic vein marks the location of the deltopectoral range. The deltopectoral interval deepened by blunt dissection to the clavipectoral fascia.

Retract the cephalic vein laterally and the major pectoral medialward. Divide the clavipectoral fascia to expose the major and minor tuberosities and the bicipital groove. To help facilitate reduction and improve fracture visualization, release the upper third of the major pectoral from the diaphysis. It is important to place a finger under the major pectoral, while it is released to protect the tendon from the biceps, which is directly below. Extend dissection distally over the lateral diaphysis of the humerus to pectoral and medial insertion to deltoid insertion.



Reducing fracture and temporary fixation

Proper fracture reduction is essential to achieve good bone consolidation and restore full functionality. In some cases, it may be advisable to practice a closed reduction before preparing the patient for surgery. Reduce the fragments of the humeral head and check the reduction with the fluoroscope. (See image 1)

Kirschner wires 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 wires do not interfere with proper plate placement.

Note: Locking screws are not suitable for reduction, as they do not allow compression to be applied, therefore it is necessary to have reduced the fragments of the humeral head before inserting the locking screws.

Suture

Provisionally reduce the tuberosities of the humerus with sutures through the insertions of the subscapular, infraspinous and supraspinous muscles. These sutures will help maintain rebuild stability when attached to the plate later.

Suture placement is especially recommended in case of weak bone, which only allows the insertion of short screws to avoid the risk of perforation.

Preparing the position of the plate

To make the plate in the optimal position, insert two Kirschner indicator wires about 2 to 4mm laterally with reference to the bicipital groove and 5 to 7mm below the tip of the larger tuber (or trochiter). (See image 2)

Caution: If the plate is placed too high, it increases the risk of subacromial conflict, if the plate is placed too low, it may prevent the optimal distribution of the screws in the head and the insertion of screws into the proximal part

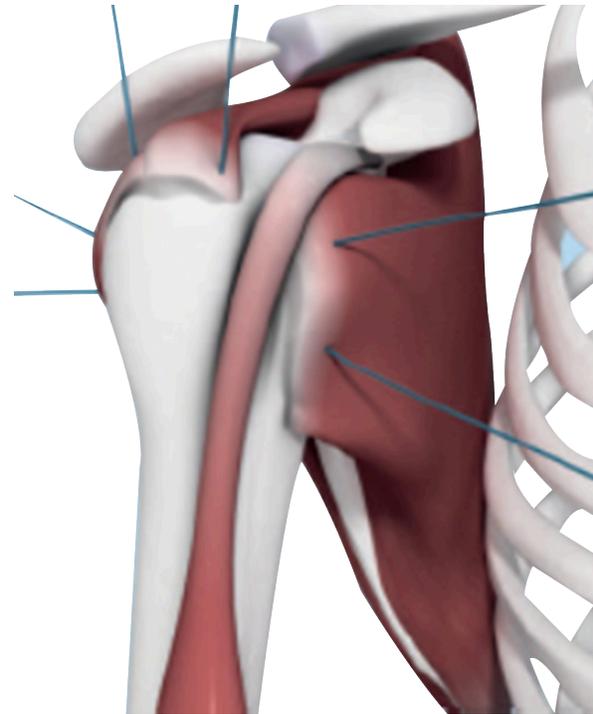


Image 1

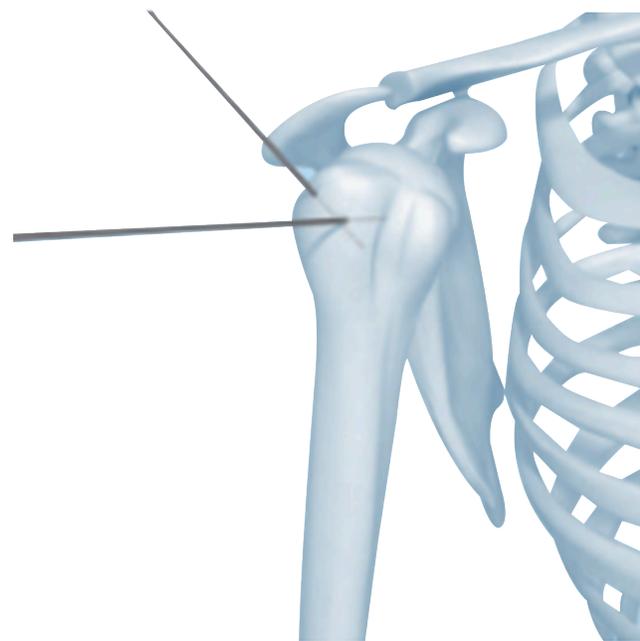


Image 2

Inserting and temporary fixing of the plate

Before placing the plate on the bone, screw a threaded drill guide into the peripheral holes of the plate head. Use threaded guides as handling elements to place the plate on the bone. Insert the plate and place it on the reduced bone, between the Kirschner wires inserted in step 2.5. (See image 3)

Temporarily secure the plate with a cortex screw through the elongated combined hole in the plate shaft.

If necessary, insert Kirschner wires through the triple insertion assembly (external threaded jacket, drill guide, and centering guide) to temporarily secure the humeral head. (See image 4)

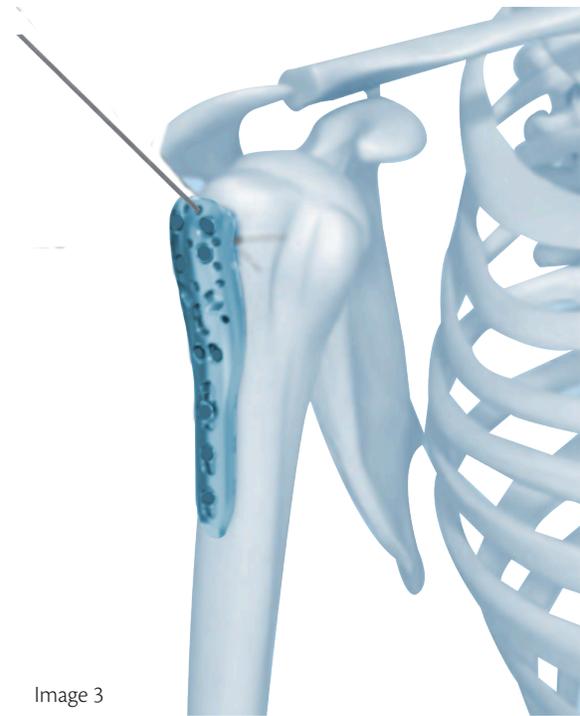


Image 3

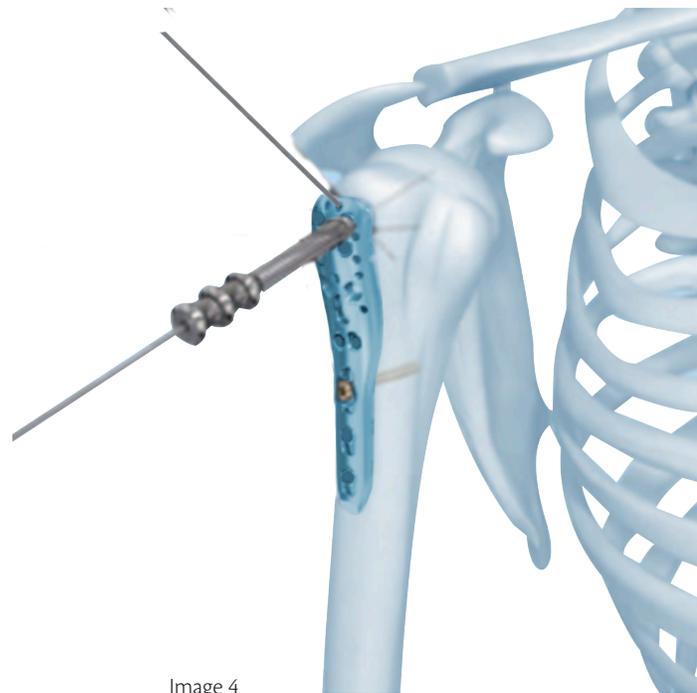


Image 4

Pre-drilling of the lateral cortical and determining the length of the proximal screws

Enter the threaded drill guide (128.27) into the desired hole of the PROH-LOCK. Through the threaded sleeve, drill the side cortical with 2.7mm bit. (See image 5). Repeat the same procedure for all required proximal holes.

Remove the threaded guide, and enter the depth meter and make it move carefully to the humeral head. Stop your progress when you notice an increase in bone density. Read directly on the appropriate length depth meter of the screw. (See image 6)

Warning: Do not advance the depth meter across the joint surface.

Note: The tip of the depth meter should be located between 5 and 8mm below the joint surface.

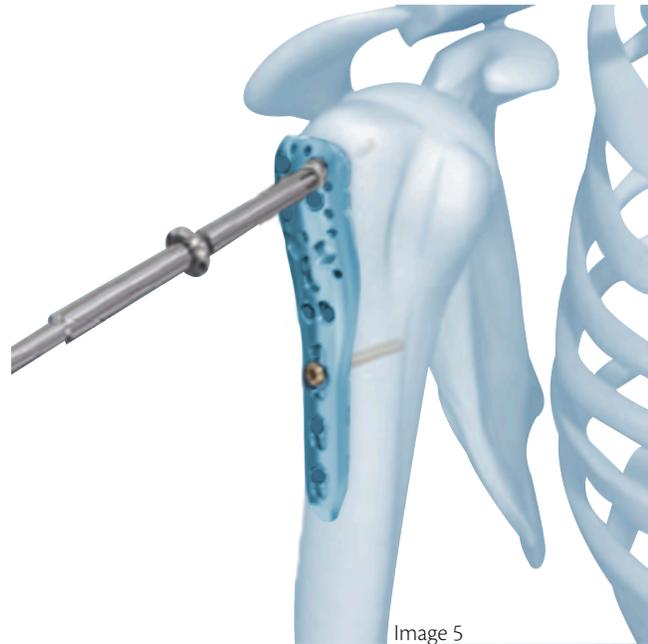


Image 5



Image 6

Inserting the proximal screws

Insert the locking screw with the hexagon screwdriver tip mounted on the 1.5Nm dynamometric adapter. Angular stability decreases if a locking screw is inserted obliquely.

Insert the screw until you hear a click. (See image 7)

Repeat the same procedure with all required proximal holes

Note: The plate must be fastened with at least 4 proximal screws. In case of poor quality bone, multiple fixing with all screws is recommended.

Inserting distal screws into the plate shaft: cortex screws

The holes in the distal section of the plate (those ranging from section F to H in the figure on page 4) are combined ALP holes, which can be fixed with a cortex screw to generate interfragmentary compression. In this case, the screws are inserted by the usual process to secure standard ALP plates, but using the universal drill guide instead of the threaded drill guide. (See image 8)

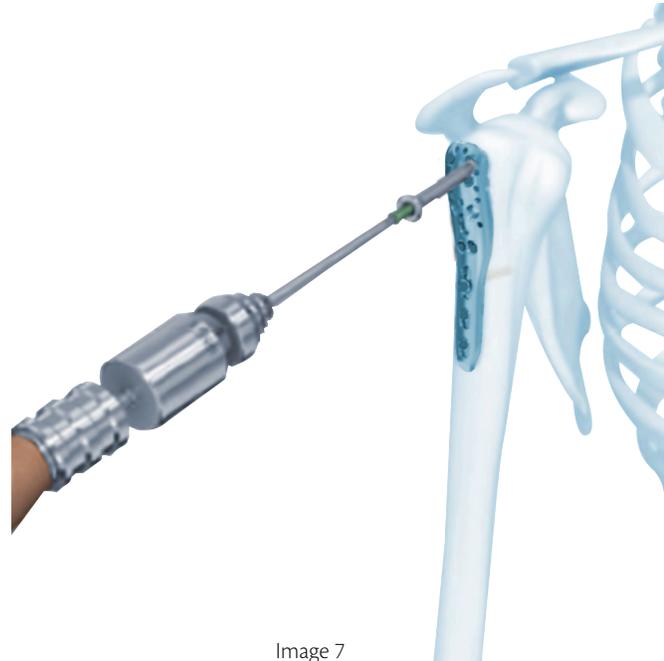


Image 7

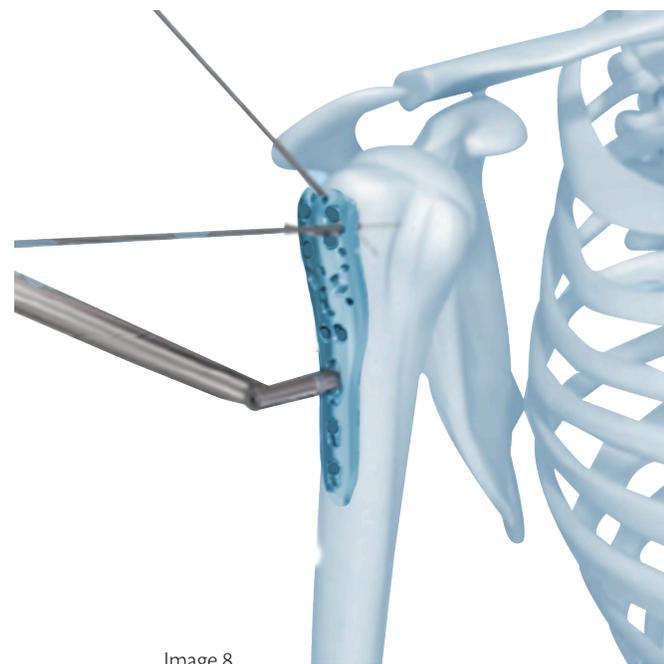


Image 8

Inserting distal screws into the plate shaft: locking screws

a) Positioning the threaded drill guide (128.27)

Carefully place the drill guide (128.27) in the threaded part of the desired combined hole, until it is fully seated on the thread. The threaded drill guide ensures that the screw is properly locked on the plate. Angular stability decreases if a locking screw is inserted obliquely. (See image 9)



Image 09

b) Pre-drilling and screw insertion through the hole, pre-drill with the 2.7mm bicortical bit. (See image 10)
Remove the drill guide.



Image 10

Use the depth meter to determine the appropriate screw length.
(See image 11)

Insert the locking screws according to the procedure described before.
Distal locking screws must be locked in the hole combined with a
90° angle to ensure optimal stability.

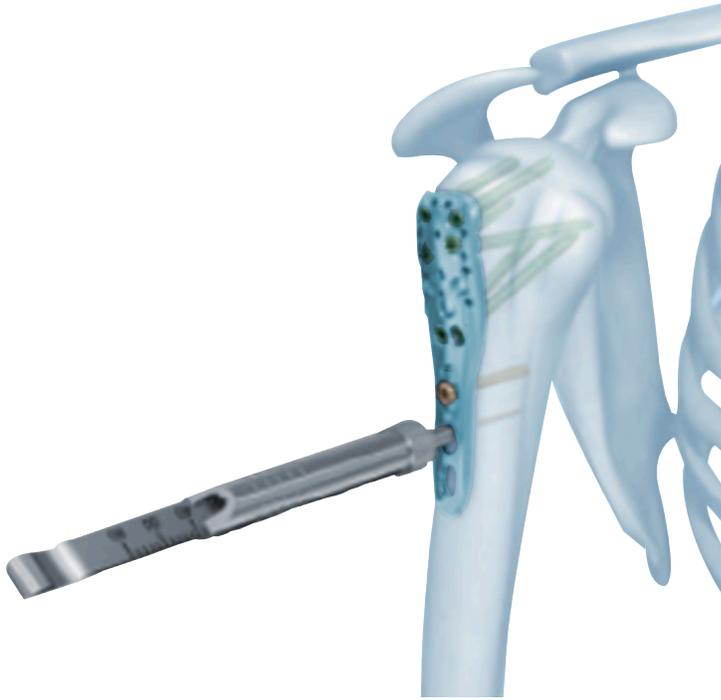


Image 11



Image 12

Fixing sutures

If you haven't already, knot the sutures through the indicated holes on the plate. This assembly works as a tension tape and transmits the sleeve arrows of the rotators, through the plate, to the humeral diaphysis, while preventing the fragments from moving during the early stages of rehabilitation.

Final check

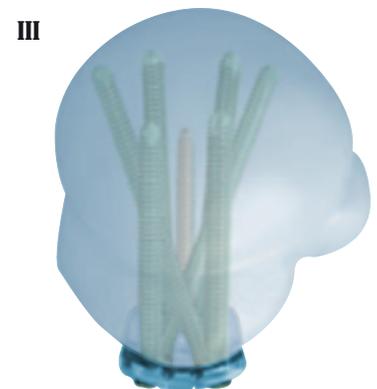
Before closing the surgical wound, check the length of the screws with the fluoroscope across the entire range of glenohumeral mobility, and make sure they do not pass through the joint surface. (See image I, II and III).

Note: It is important to check the length of the screws on all planes, as their angulation and direction are sometimes difficult to visualize.

Check the stability of the sutures. Sutures should not break during movement.

Implant removal

The decision to remove the implant corresponds to the treating physician. It is recommended to remove the implant once the consolidation process is completed, provided that it is feasible and suitable for the patient. To remove the screws, first clear the screw head by eliminating the tissue that has been able to penetrate the hexagonal inlet to ensure that the screwdriver enters properly and reduce the risk of damage in it that prevents it from being removed. Unscrew all the screws and remove them to later extract the plate.



IMPLANTS AND INSTRUMENTS

PLATES

ALP TITANIUM PROXIMAL HUMERUS PLATE PROH-LOCK

130.03 ALP titanium proximal humerus plate PROH-LOCK 3 holes

130.05 ALP titanium proximal humerus plate PROH-LOCK 5 holes

ALP TITANIUM PROXIMAL HUMERUS PLATE PROH-LOCK LARGE

129.04 ALP titanium proximal humerus plate PROH-LOCK LARGE 4 holes

129.06 ALP titanium proximal humerus plate PROH-LOCK LARGE 6 holes

129.08 ALP titanium proximal humerus plate PROH-LOCK LARGE 8 holes

129.10 ALP titanium proximal humerus plate PROH-LOCK LARGE 10 holes

SCREWS

3.5mm TITANIUM CORTEX LOCKING SCREW

106.12 3.5mm titanium cortex locking screw 12 mm

106.14 3.5mm titanium cortex locking screw 14 mm

106.16 3.5mm titanium cortex locking screw 16 mm

106.18 3.5mm titanium cortex locking screw 18 mm

106.20 3.5mm titanium cortex locking screw 20 mm

106.22 3.5mm titanium cortex locking screw 22 mm

106.24 3.5mm titanium cortex locking screw 24 mm

106.26 3.5mm titanium cortex locking screw 26 mm

106.28 3.5mm titanium cortex locking screw 28 mm

106.30 3.5mm titanium cortex locking screw 30 mm

106.32 3.5mm titanium cortex locking screw 32 mm

106.34 3.5mm titanium cortex locking screw 34 mm

106.36 3.5mm titanium cortex locking screw 36 mm

106.38 3.5mm titanium cortex locking screw 38 mm

106.40 3.5mm titanium cortex locking screw 40 mm

106.45 3.5mm titanium cortex locking screw 45 mm

106.50 3.5mm titanium cortex locking screw 50 mm

106.55 3.5mm titanium cortex locking screw 55 mm

106.60 3.5mm titanium cortex locking screw 60 mm

3.5mm TITANIUM CORTEX SCREW

- 112.12 3.5mm titanium cortex screw 12mm
- 112.14 3.5mm titanium cortex screw 14mm
- 112.16 3.5mm titanium cortex screw 16mm
- 112.18 3.5mm titanium cortex screw 18mm
- 112.20 3.5mm titanium cortex screw 20mm
- 112.22 3.5mm titanium cortex screw 22mm
- 112.24 3.5mm titanium cortex screw 24mm
- 112.26 3.5mm titanium cortex screw 26mm
- 112.28 3.5mm titanium cortex screw 28mm
- 112.30 3.5mm titanium cortex screw 30mm
- 112.32 3.5mm titanium cortex screw 32mm
- 112.34 3.5mm titanium cortex screw 34mm
- 112.36 3.5mm titanium cortex screw 36mm
- 112.38 3.5mm titanium cortex screw 38mm
- 112.40 3.5mm titanium cortex screw 40mm
- 112.45 3.5mm titanium cortex screw 45mm
- 112.50 3.5mm titanium cortex screw 50mm
- 112.55 3.5mm titanium cortex screw 55mm
- 112.60 3.5mm titanium cortex screw 60mm

3.5mm TITANIUM CANCELLOUS LOCKING SCREW

- 107.12 3.5mm titanium cancellous locking screw 12mm
- 107.14 3.5mm titanium cancellous locking screw 14mm
- 107.16 3.5mm titanium cancellous locking screw 16mm
- 107.18 3.5mm titanium cancellous locking screw 18mm
- 107.20 3.5mm titanium cancellous locking screw 20mm
- 107.22 3.5mm titanium cancellous locking screw 22mm
- 107.24 3.5mm titanium cancellous locking screw 24mm
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- 107.36 3.5mm titanium cancellous locking screw 36mm
- 107.38 3.5mm titanium cancellous locking screw 38mm
- 107.40 3.5mm titanium cancellous locking screw 40mm
- 107.45 3.5mm titanium cancellous locking screw 45mm
- 107.50 3.5mm titanium cancellous locking screw 50mm
- 107.55 3.5mm titanium cancellous locking screw 55mm
- 107.60 3.5mm titanium cancellous locking screw 60mm

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.

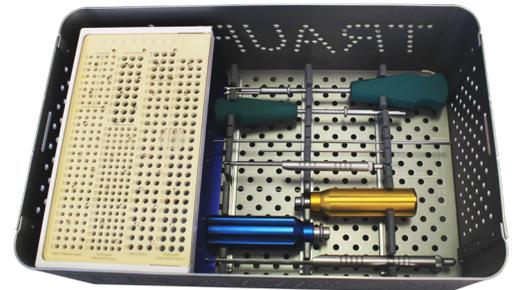
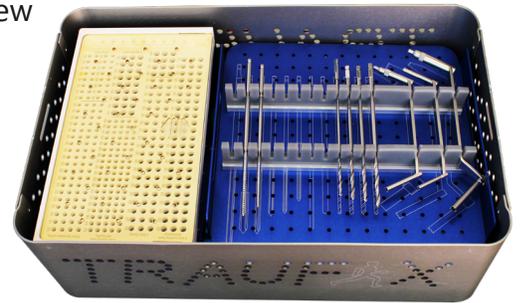
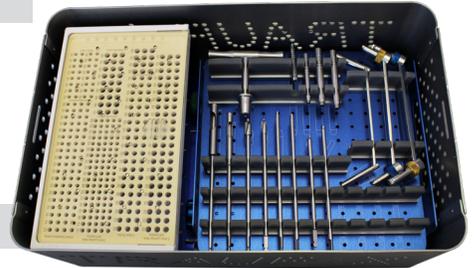
CODE	DESCRIPTION
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128.27	Drill guide for 2.7mm drill bit
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Other generic instruments needed:

QTY.	DESCRIPTION
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- | | |
|---|---------------------------------------------------|
| 2 | 2.0mm threaded guide-wire |
| 2 | 1.5mm threaded guide-wire |
| 1 | 2.5mm hexagonal screwdriver for 3.5mm/4.5mm screw |
| 1 | 2.5mm eccentric neutral drill guide |
| 1 | 2.5mm/3.5mm double drill guide |
| 1 | 2.5mm/3.5mm double drill guide |
| 1 | Torque wrench AO of 1.5Nm |
| 1 | T-handle with quick coupling (AO) |
| 1 | 60mm depth gauge |
| 1 | 6mm countersink tip for 3.5mm/4.0mm screw |
| 1 | 2.5mm screwdriver hexagonal tip |
| 1 | 2.5mm hexagonal screw extractor tip |
| 1 | 3.5mm tap tip |
| 1 | 6.5mm reamer tip for small fragments |
| 1 | 2.5mm drill bit quick coupling |
| 1 | 2.7mm drill bit quick coupling |





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Guanajuato, México.
Tel. +52 419 688 1191