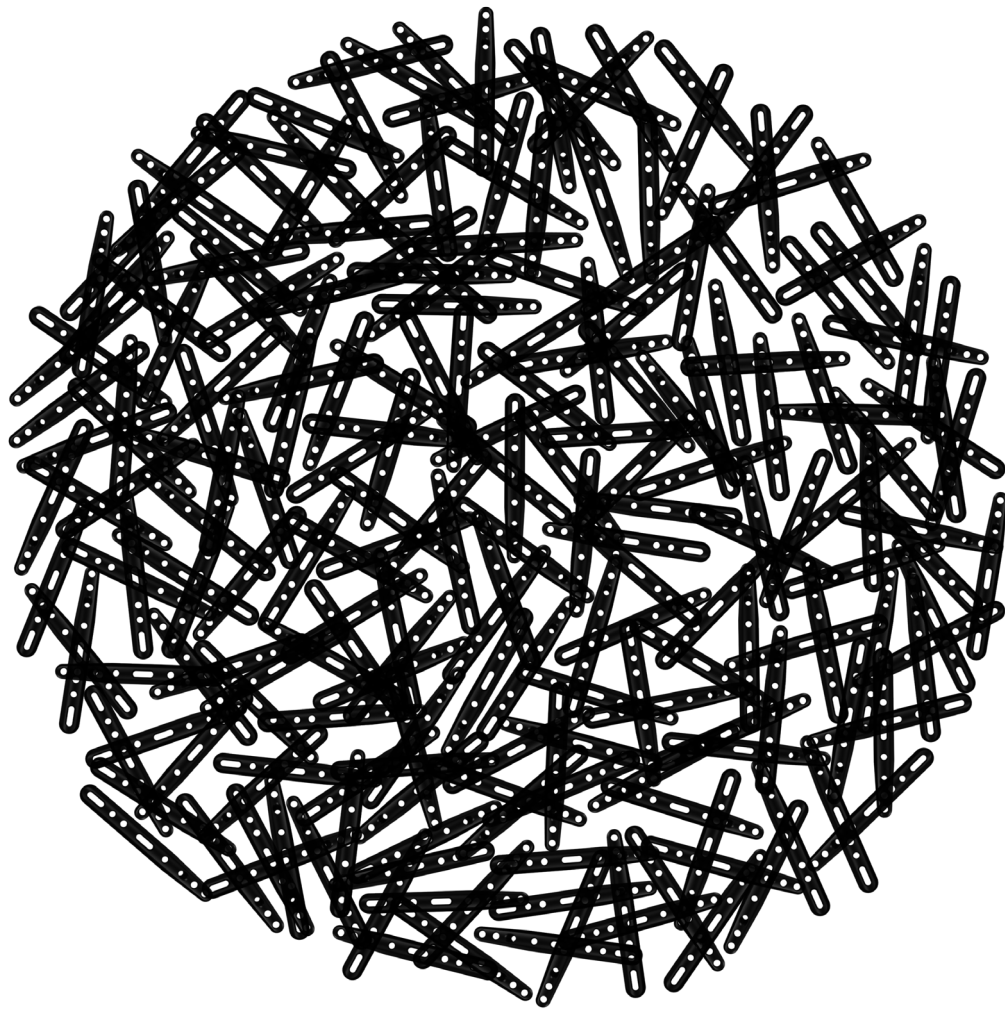


# ITS.

Implants  
trauma



## UOL

Ulna Osteotomy Locking Plate

All ITS plates are preformed anatomically as a matter of principle. If adjustment of the plate to the shape of the bone is required, this is possible by carefully bending gently in one direction once. Particular care is required when bending in the region of a plate hole, as deformation of the plate may lead to a failure of the locking mechanism. The plate must not be buckled or bent several times. This is particularly important in the case of titanium implants, to prevent material fatigue and subsequent failure. The method of bending is the conscious responsibility of the operating doctor; I.T.S. GmbH can accept no liability whatsoever for this.

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- P. 7 Properties
- P. 8 Indications & Contraindications

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# Introduction



## ○ Preface

The Ulna Osteotomy Locking Plate provides a plate system (hybrid system) to be fixated with locking screws and compression screws, which is specially adapted to the anatomic and biomechanic requirements after a shortening osteotomy of the distal ulna. In a single device, the Ulna Osteotomy Locking Plate allows for a unique coplanar orientation of the incision with rotation-stable shortening and the option for compression.

The standardization of multiple surgical procedures into a single device system improves the quality of the surgical procedure.



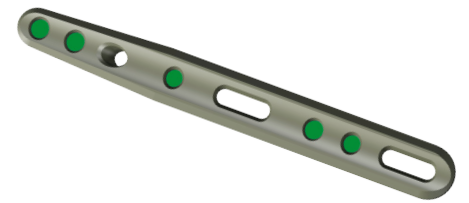
## ○ Screws

3730I-XX Cortical Screw, locking, D=3.0mm

61243-100 Spiral Drill, D=2.4mm, L=100mm, AO Connector

56095-70 Screwdriver, Torque, T9x70

56095-70-2 Self-holding sleeve, Screwdriver, Torque 9

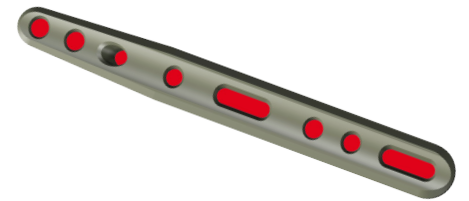


3227I-XX Cortical Screw, D=2.7mm

61203-100 Spiral Drill, D=2.0mm, L=100mm, AO Connector

56095-70 Screwdriver, Torque, T9x70

56095-70-2 Self-holding sleeve, Screwdriver, Torque 9

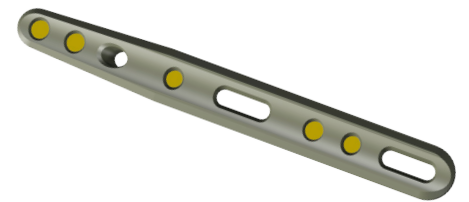


37302-XX Cancellous Screw, locking, D=3.0mm

61203-100 Spiral Drill, D=2.0mm, L=100mm, AO Connector

56095-70 Screwdriver, Torque, T9x70

56095-70-2 Self-holding sleeve, Screwdriver, Torque 9



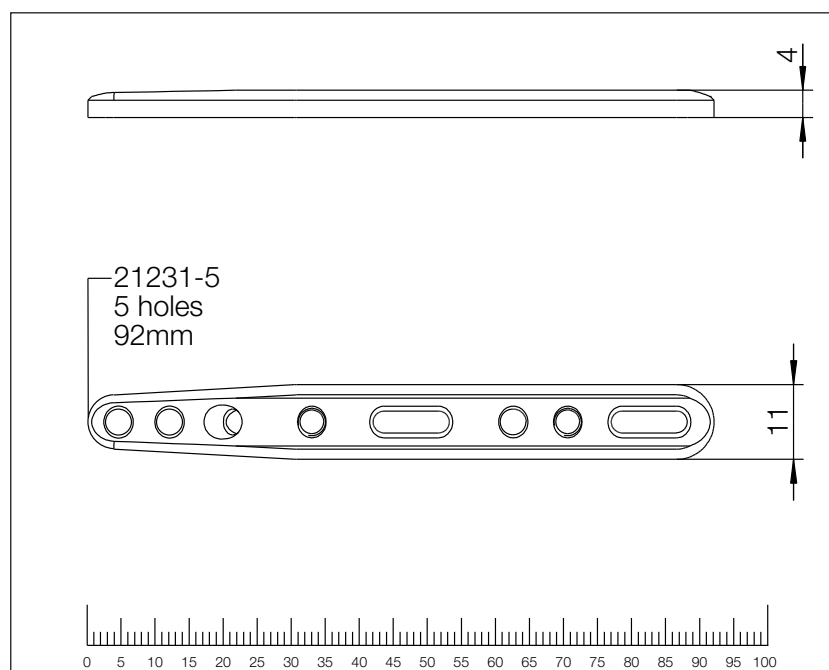
## ○ Properties

### Properties of the material:

- ◆ Plate material: Titanium
- ◆ Material of screws: TiAl6V4 ELI
- ◆ Easier removal of the implant after the fracture has healed
- ◆ Improved fatigue strength of the implant
- ◆ Reduced risk of cold welding
- ◆ Reduced risk of inflammation and allergy

### Properties of the implant:

- ◆ Multi-directional Locking
- ◆ Anatomically shaped
- ◆ Plate length: 5-hole
- ◆ No dislocation of the parts of the bone due to fixation using longhole
- ◆ Positioning of the plate prior to the osteotomy
- ◆ Compression instrument for simple joining of the osteotomy surfaces (selective compression strength)
- ◆ No loss of correction due to locking
- ◆ A screw can be placed through both osteotomy surfaces as a tension or fixation screw, optional locking



## ○ Indications & Contraindications

### Indications:

- ◆ Impaction syndrome of the ulnar wrist
- ◆ Symptomatic, post-traumatic ulnar malposition in the distal radio-ulnar joint (DRUJ)
- ◆ Degenerative ulnar wrist
- ◆ Correction of the ulnar position relative to the unaffected other side up to a maximum of 6mm in one step or 13mm in two steps (see figure page 19)

### Extended Indications:

- ◆ Primary ulnar shortening in forearm fractures with insufficient reconstruction of the length of the radius
- ◆ Deformities
- ◆ Degenerative ulnar variant in conically shaped DRUJ according to Förstner

### Contraindications:

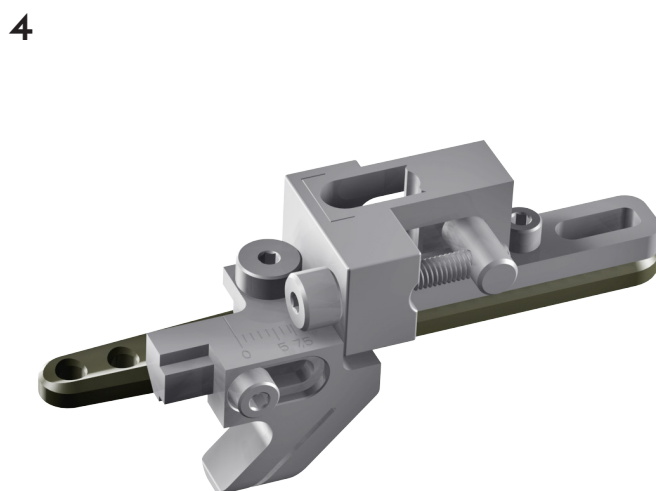
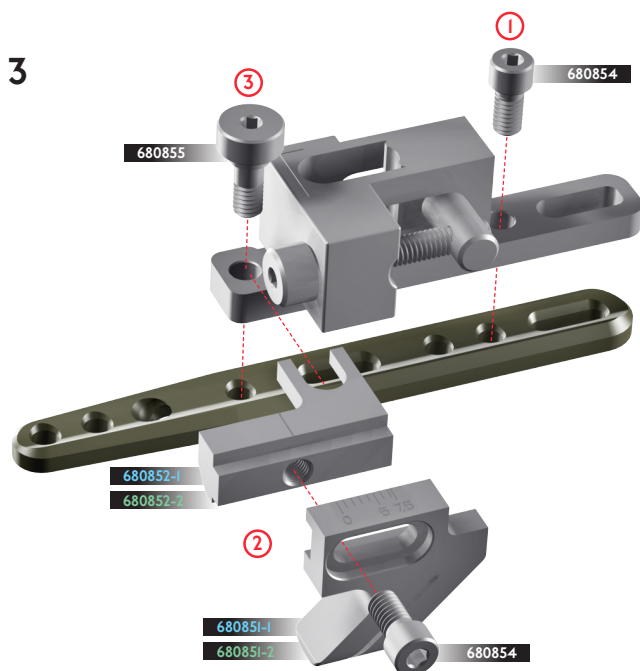
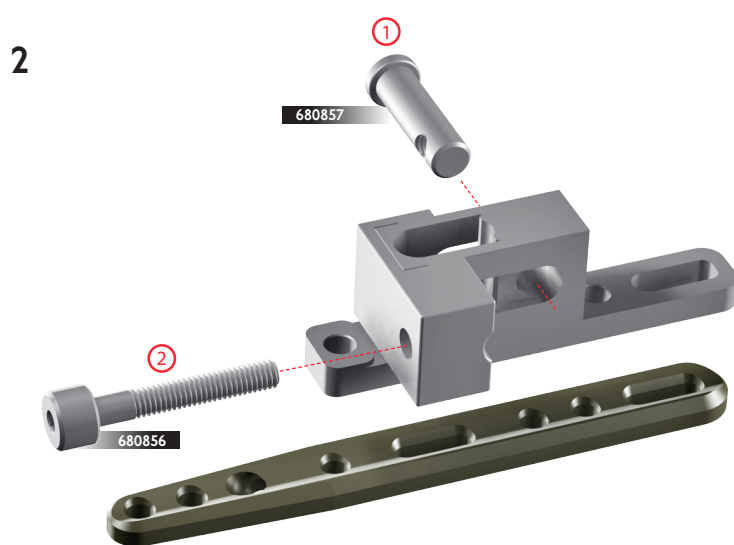
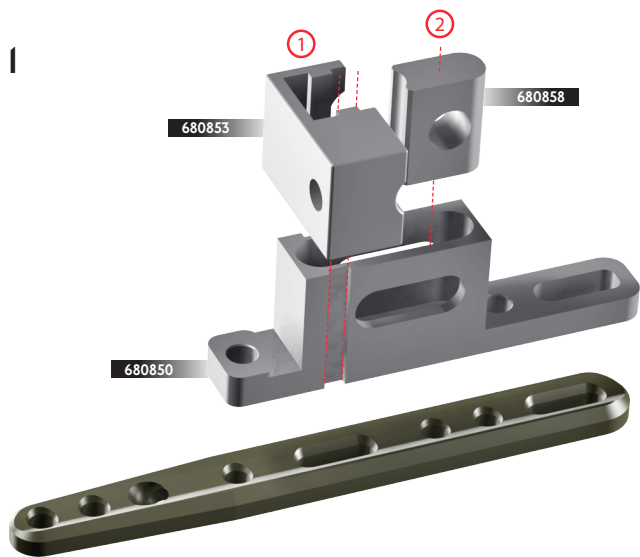
- ◆ Severe osteoporosis
- ◆ Existing bone or soft tissue infections in the operation field
- ◆ In cases of skin and soft tissue problems
- ◆ Obesity
- ◆ Lack of patient compliance



# Surgical Technique

2.

## ○ Assembling of the instruments



◆ Part for left version   ◆ Part of right version

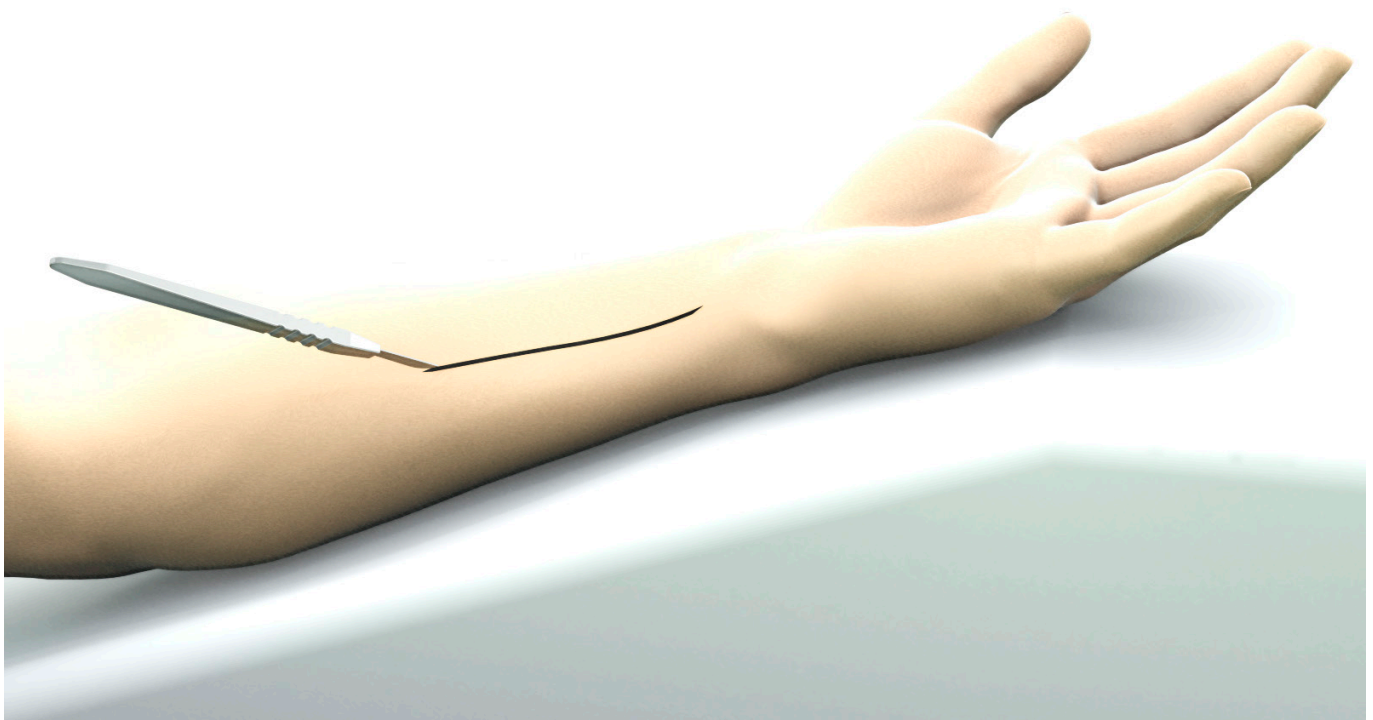
## ○ Pre-operative patient preparation

Place the patient in a supine position, cover the arm to be freely mobile and place it on an X-ray transparent table at a shoulder abduction of 90°. Perform the operation under regional or general anaesthesia with or without using a tourniquet on the upper arm. The shape of the implant allows for palmar, ulnar or dorsal positioning of the plate. The plate should be completely fitted to the bone without protruding. As the the distal palmar section of the ulna is usually curved, more proximal positioning of the plate or pre-bending of the implant are recommended.

**Attention:** When bending the plate, make sure you bend the plate at the 2 distal bore holes only. If you bend the plate too much, it may happen that the “Locking” System doesn’t work due to deformation.

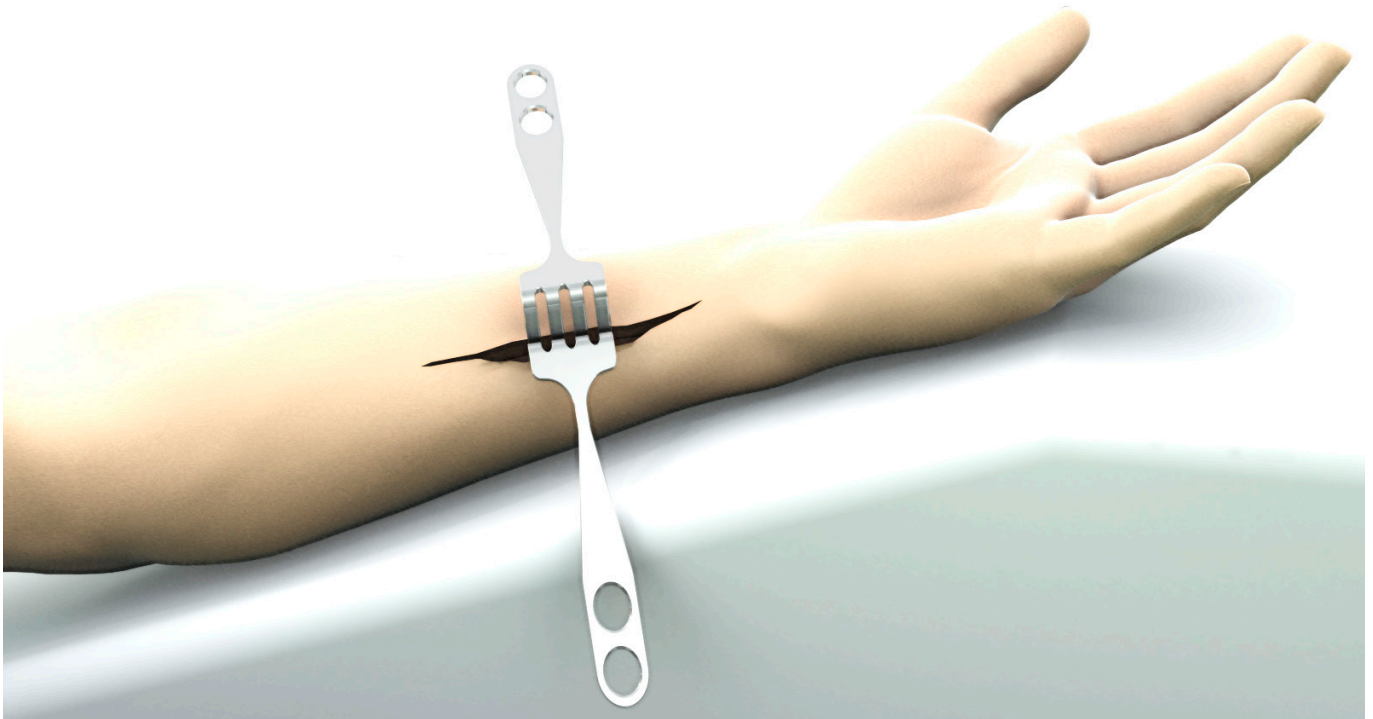
## ○ Exposure

The upper extremity is rotated outwards, the elbow is bent and the wrist is supported with a roll. Begin the incision of the skin approximately 2–3cm proximal of the evident ulna styloid process. It shall run 5mm palmar, parallel to the evident interosseous border approximately 8–9cm proximal. It is mandatory to pay attention to the dorsal branch of the ulnar nerve.



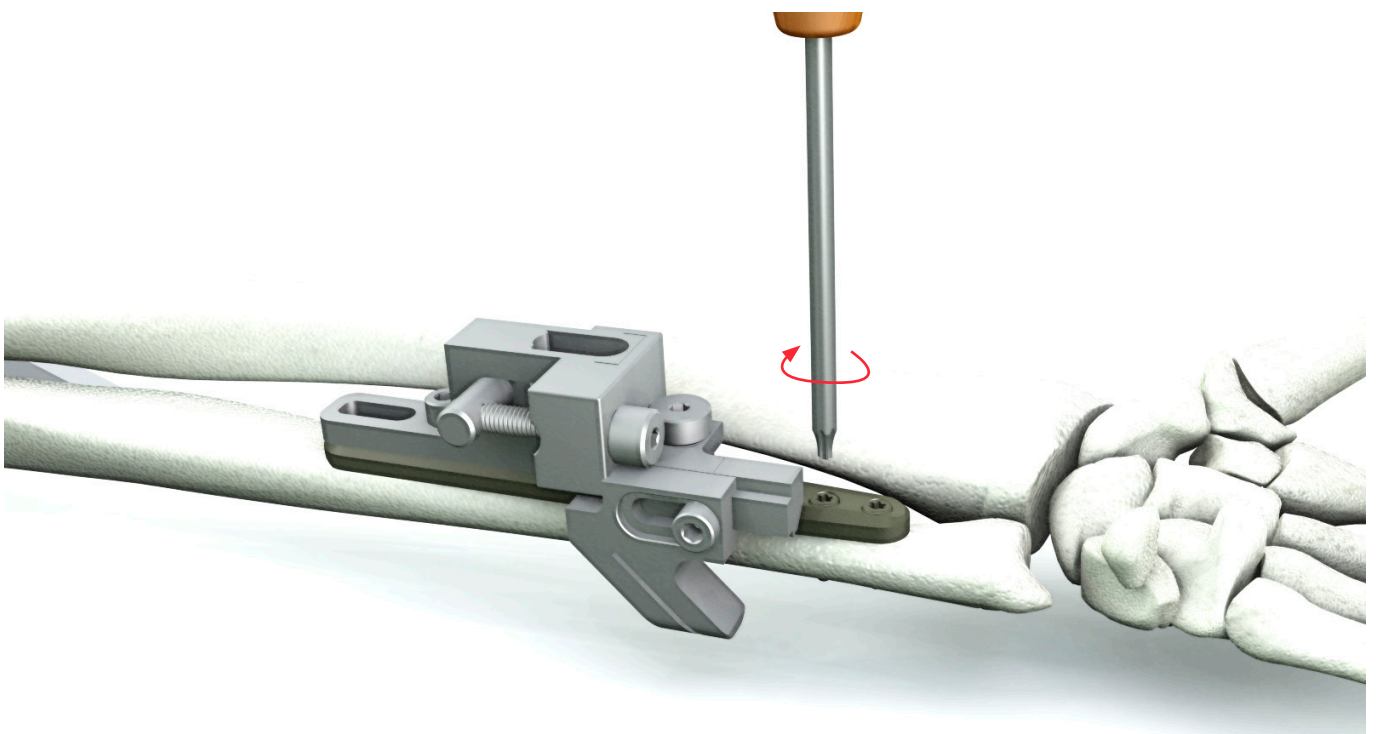
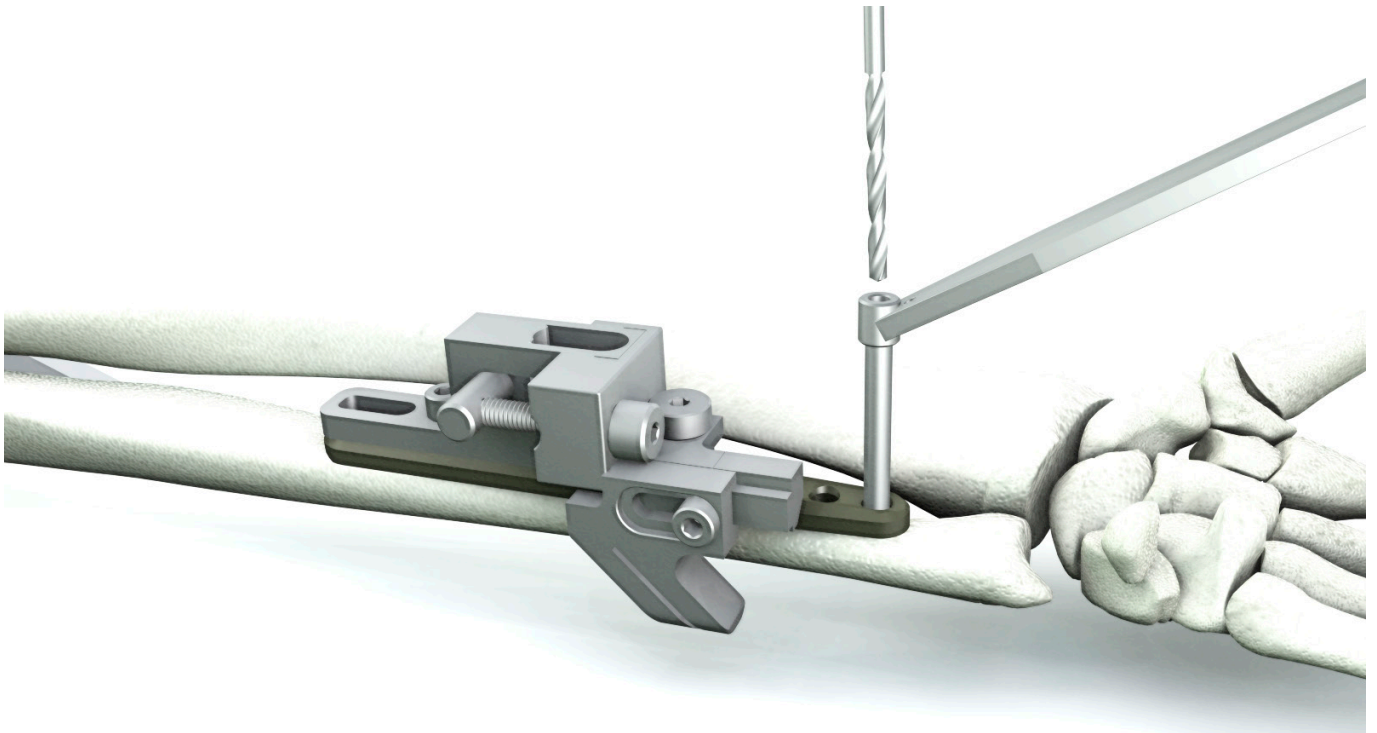
## ○ Plate insertion

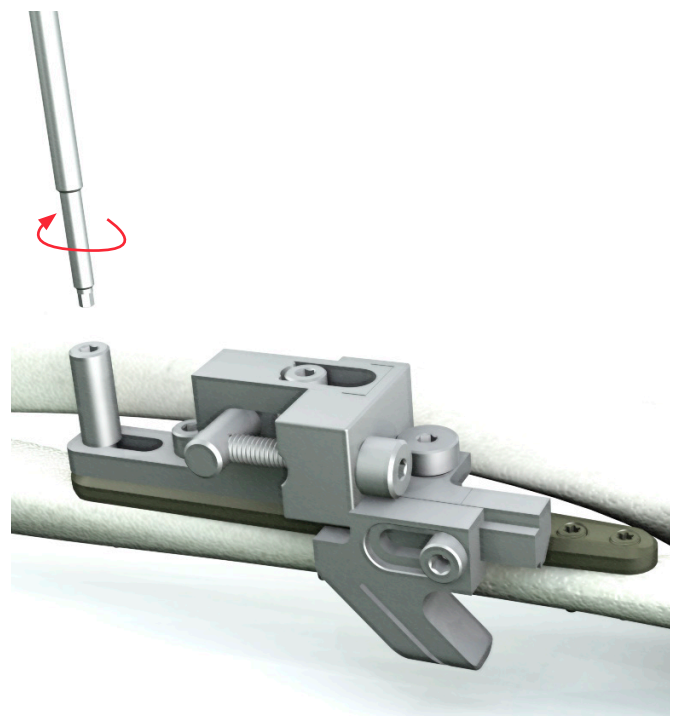
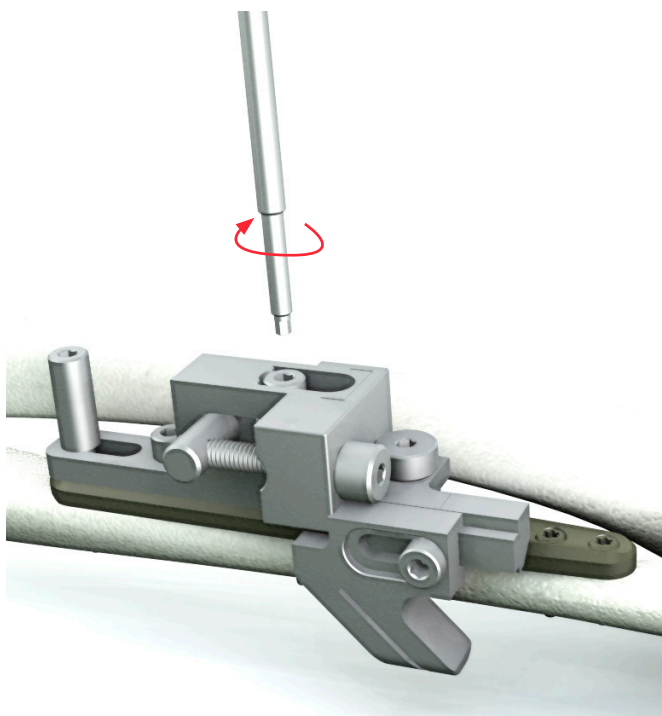
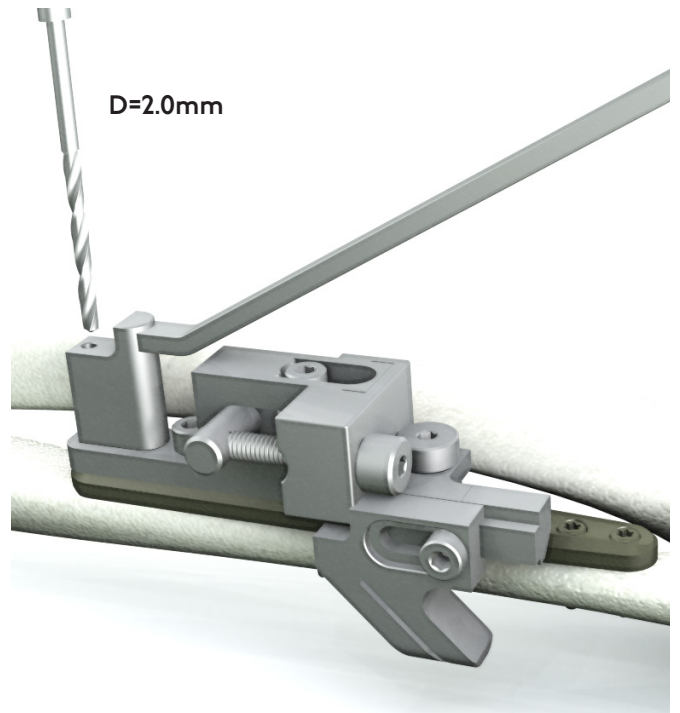
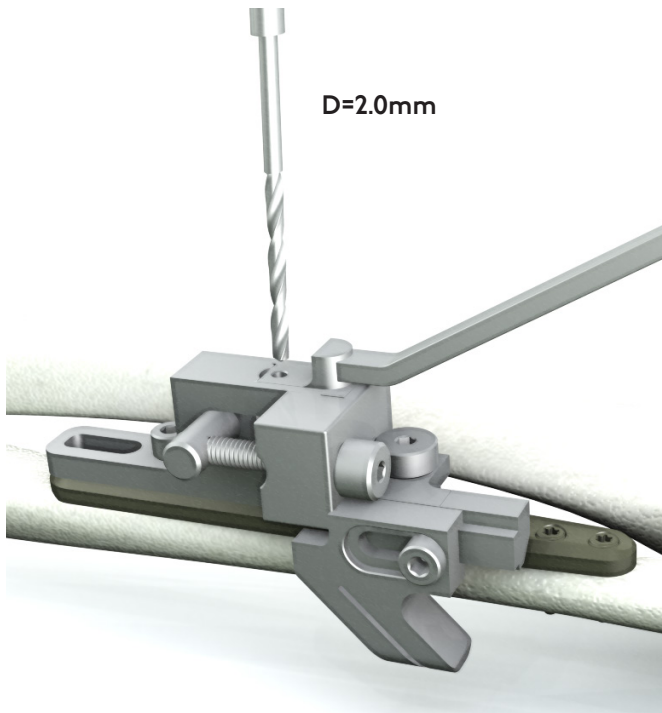
After opening the forearm fascia, mobilize bluntly the belly of the FCU (M. flexor carpi ulnaris) at its insertion point at the ulna and retract it medial using Hohmann retractors. Define the optimal position of the plate and incise the dorsal forearm fascia in the designated osteotomy area.



## ○ Placement of the tension bolts

Place the assembled osteotomy system jig upon the ulna osteotomy plate, which is attached to the ulna using the plate holes alternating from the outside centre; distally with D=3.0mm locking cancellous screws (**37302-XX**) or D=3.0mm locking cortical screws (**37301-XX**) (spiral drill, D=2.0mm, L=100mm, AO Connector (**61203-100**) for locking cancellous screw / spiral drill, D=2.4mm, L=100mm, AO Connector (**61243-100**) for locking cortical screw), proximally with 2 tension bolts (**680859**) after inserting the drill guide, D=2.0mm (**62208**) for the tension bolt and a D=2.0mm bore (optional D=2.4mm for hard bone).





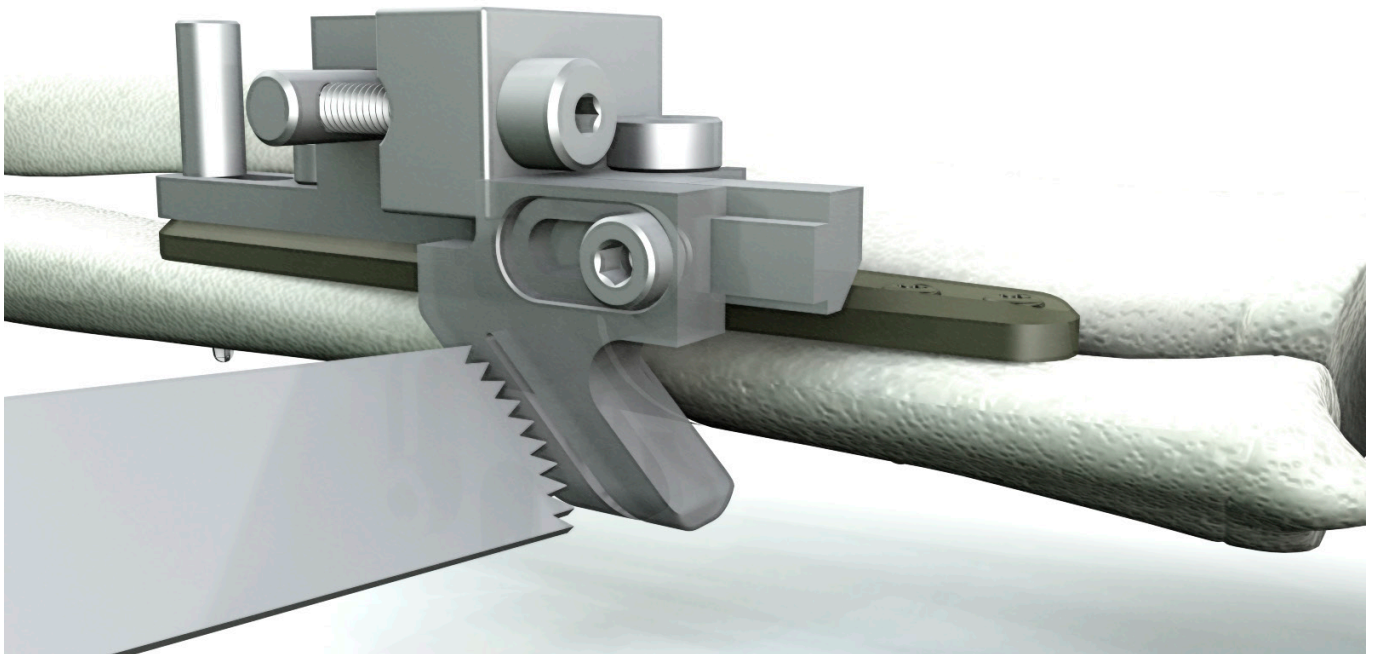
## ○ Shortening

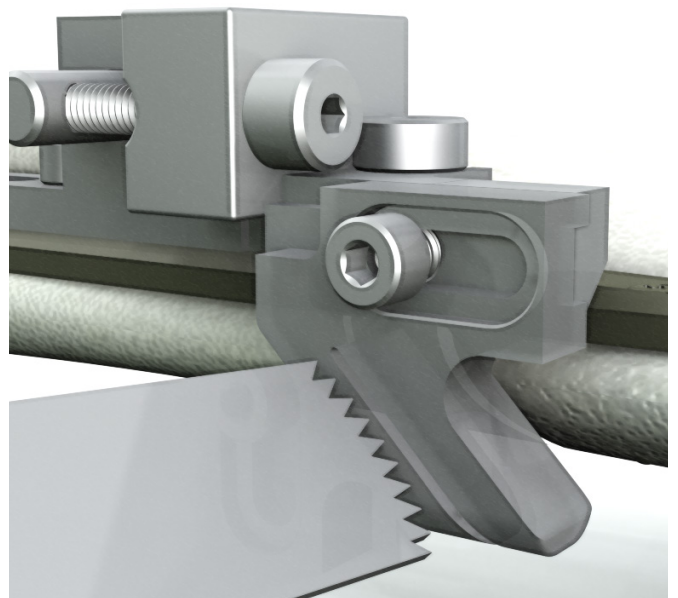
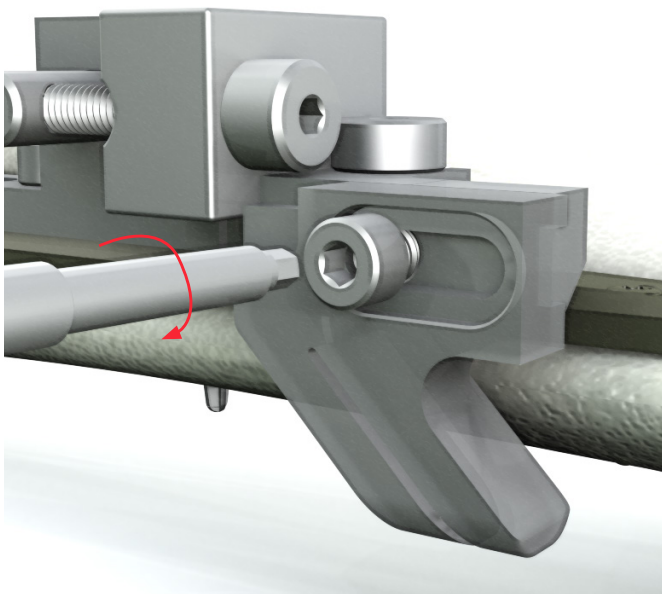
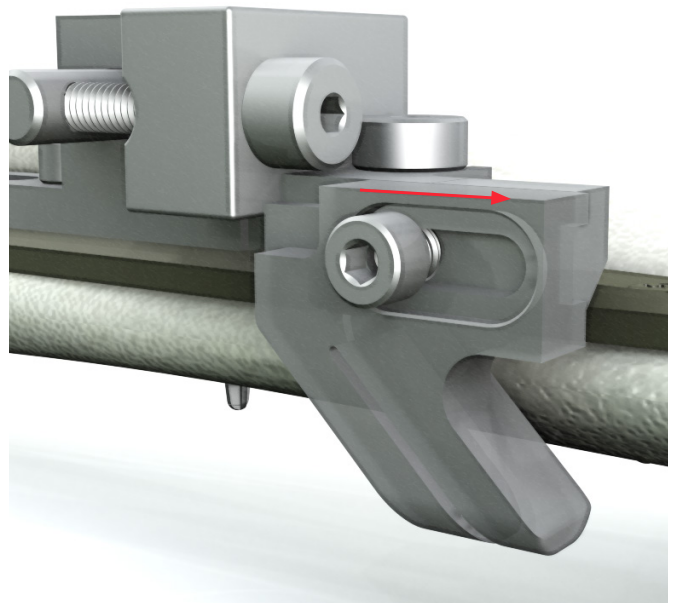
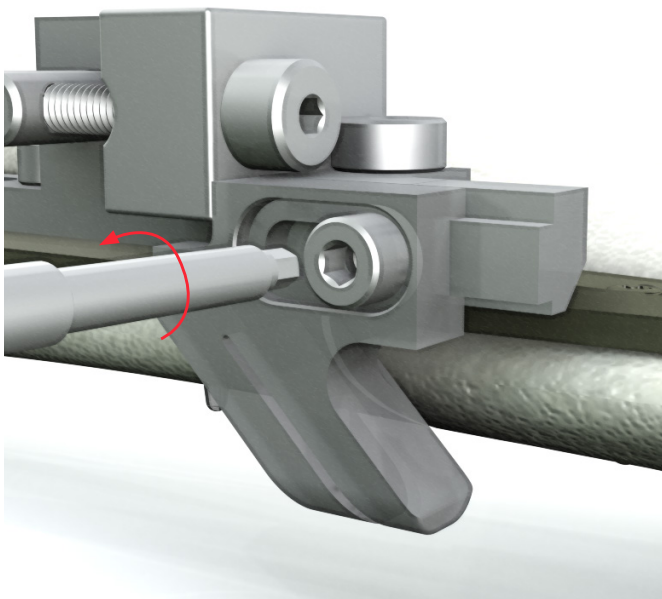
Incise the periosteum at the osteotomy site and minimally retract it before starting. Using the transection gauge and producing as little heat as possible, make two atraumatic, parallel cuts according to the measured shortening.

The maximum recommended osteotomy length is 6mm.

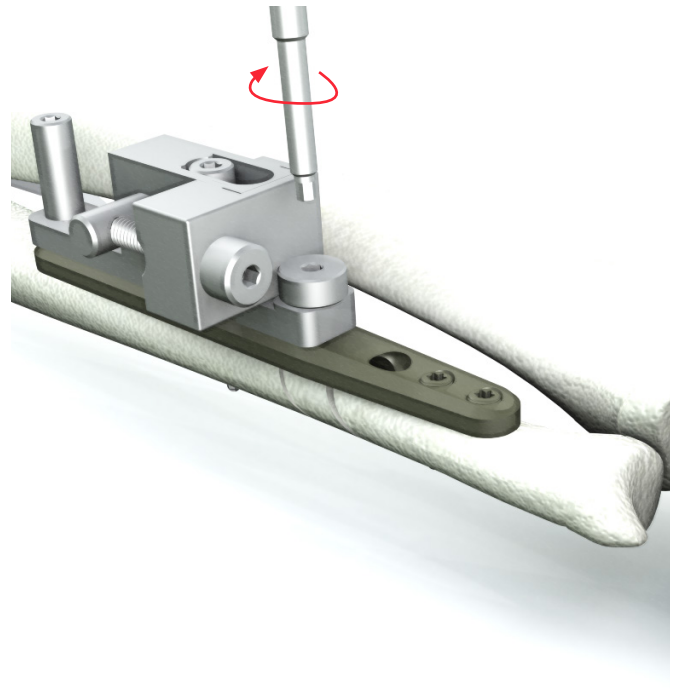
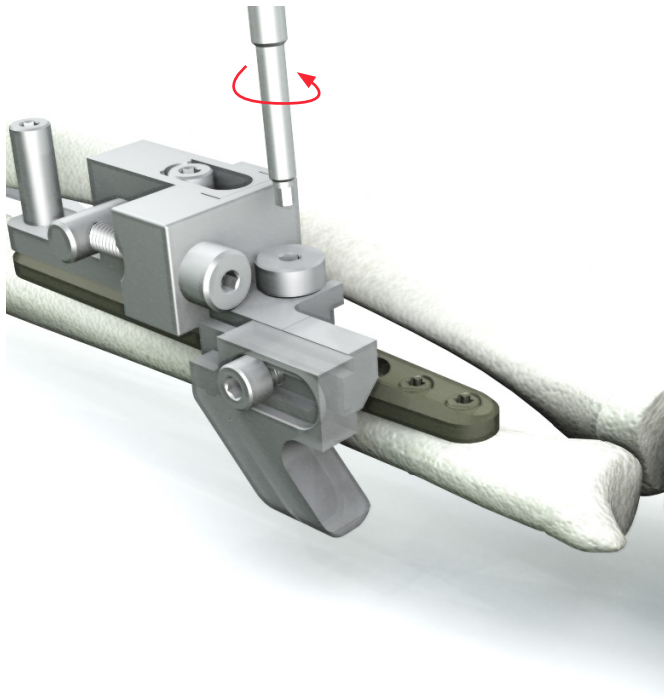
**Caution:** In osteoporotic bones, traction bolts may tilt due to high traction forces (malformation of drilled holes in osteoporotic bone).

The thickness of the saw blade is a maximum of 0.7mm. We recommend a saw blade **0.5 - 0.7mm** in thickness, to achieve a precise cut.



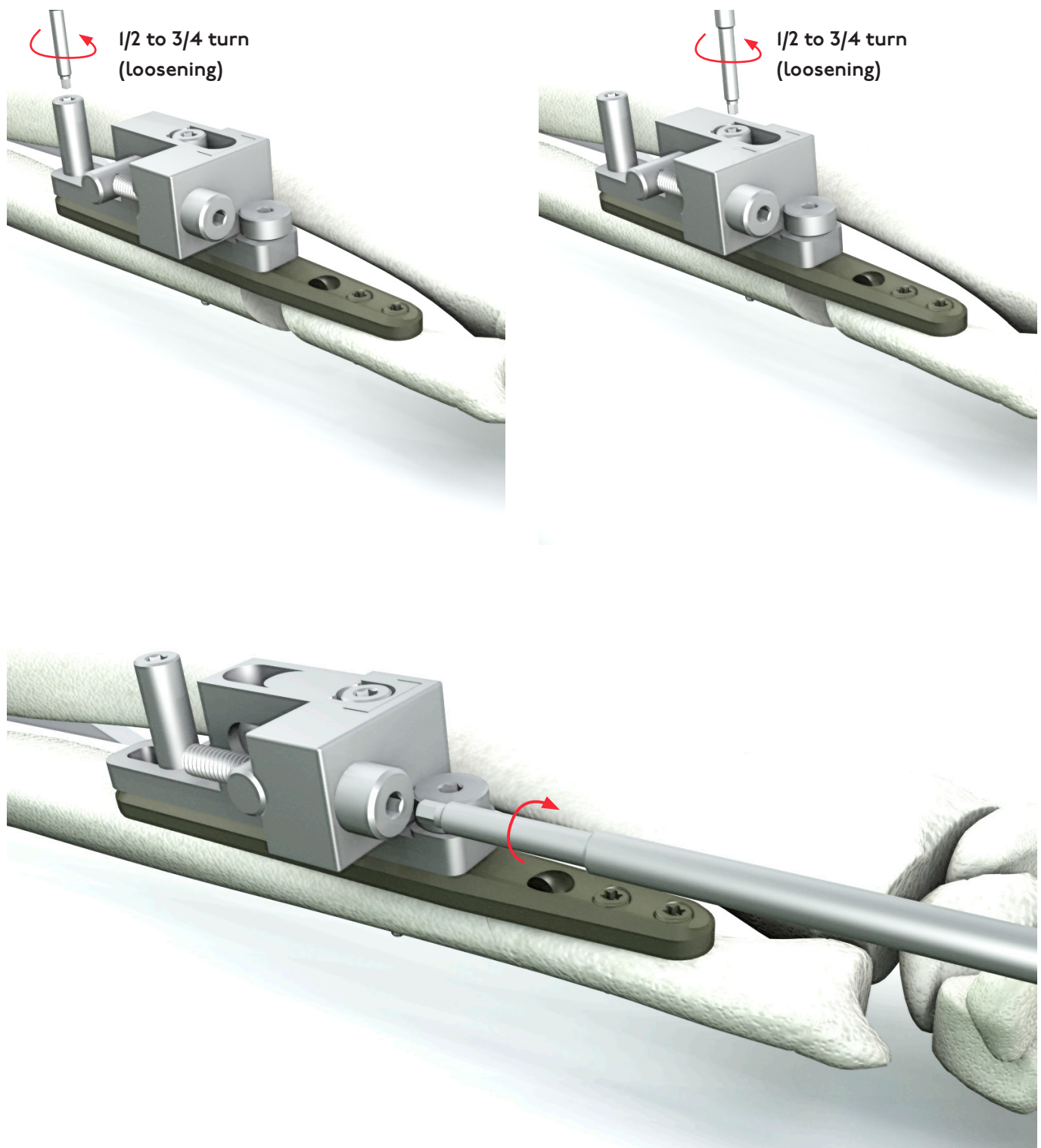






## ○ Reduction

After removal of the dissection, the osteotomy surfaces must be cleaned meticulously of bone or soft tissue remnants. After **loosening the tension bolts** (1/2 to 3/4 turn), shortening is performed using the set screw. If there are excessive tensions and shortening difficulties, this is usually the consequence of bone or soft tissue remnants. After contact of the osteotomy surfaces, prior to a desired compression, the reduction may additionally be secured using holding forceps. Finally, tighten the tension bolts firmly.



If shortening of more than 6mm is desired, two subsequent osteotomies may be performed. For recommended OT-widths please refer to table stated below.

Shortening in mm	First Osteotomy	Second Osteotomy
0 - 6	required length	-
7	4	3
8	5	3
9	6	3
10	6	4
11	6	5
12	6	6
13	7	6

Any desired shortening of 7-13mm may be performed following the initial OT by manual support and protected against rotation using a clamp, without using the adjusting screw on compression (for OT-widths, please see table above). As a result, the drill holes will stay undeformed to the greatest extent even in osteoporotic bone, while the shortening is still protected against rotation.

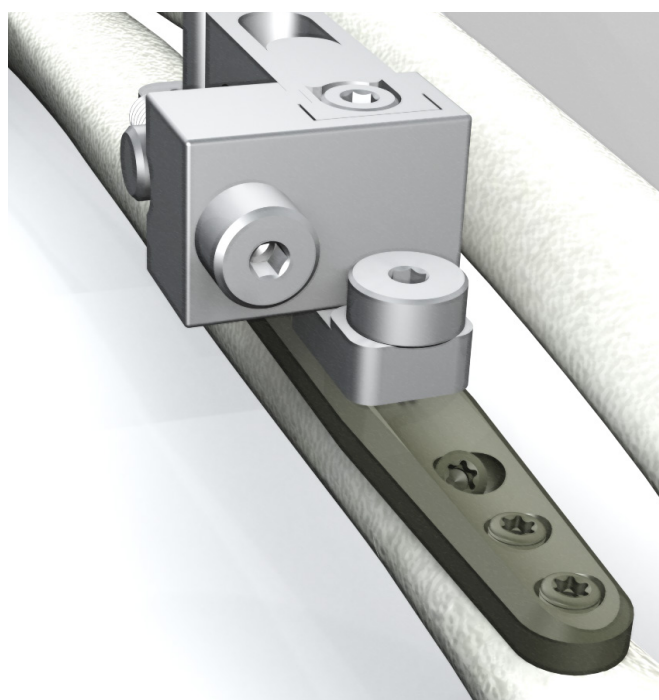
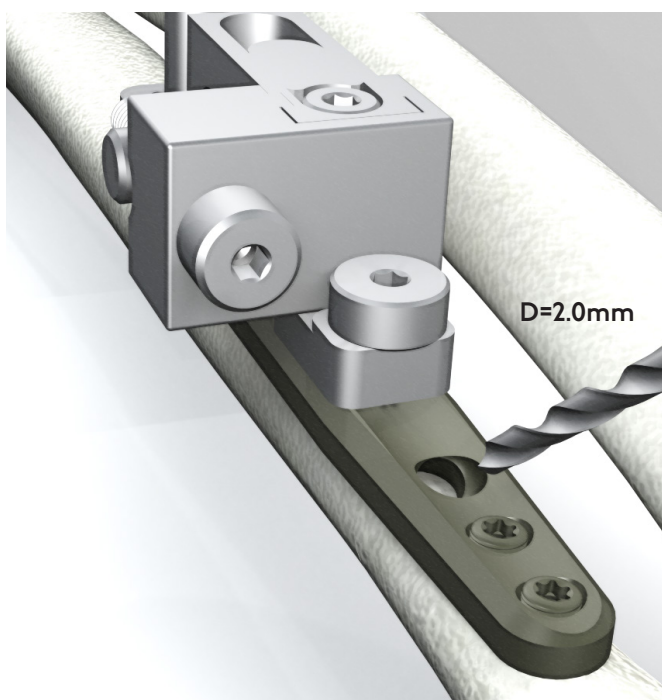
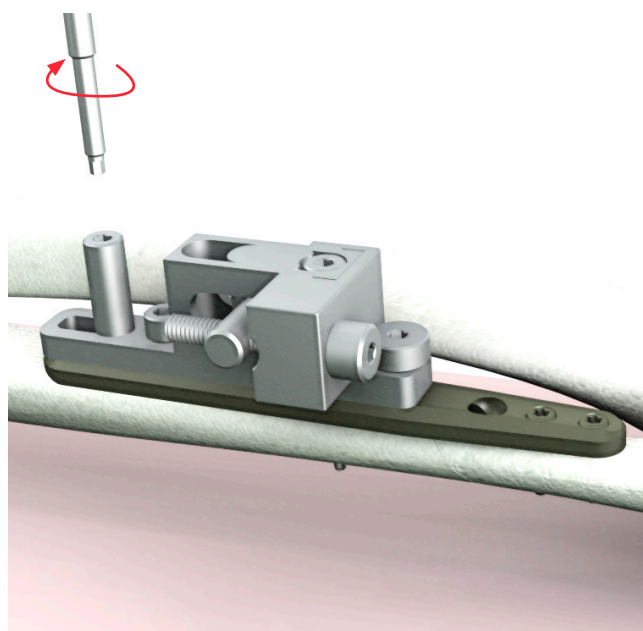
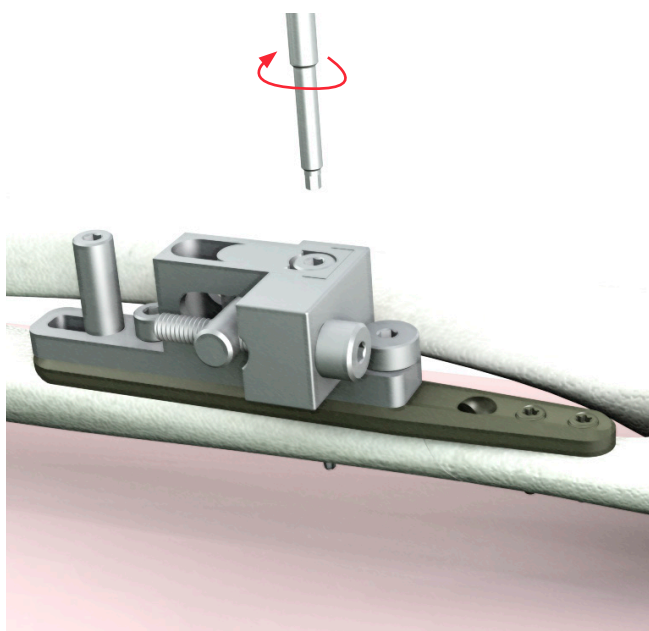
After successful shortening, the instrument is attached to the ulna in a stable manner, and the second OT is performed according to existing standards. Due to the stepwise approach, no extended implant is required, even with enhanced shortenings, and the length of the surgical incision will be unchanged.

**Caution:** At OT-widths of 11 to 13mm, we recommend not to use hole G (see figure), since the bridge between the drilled hole for the proximal traction bolt and the drilled hole in G will be too narrow. Thus, a safe fixation cannot be guaranteed, particularly not in osteoporotic bone.

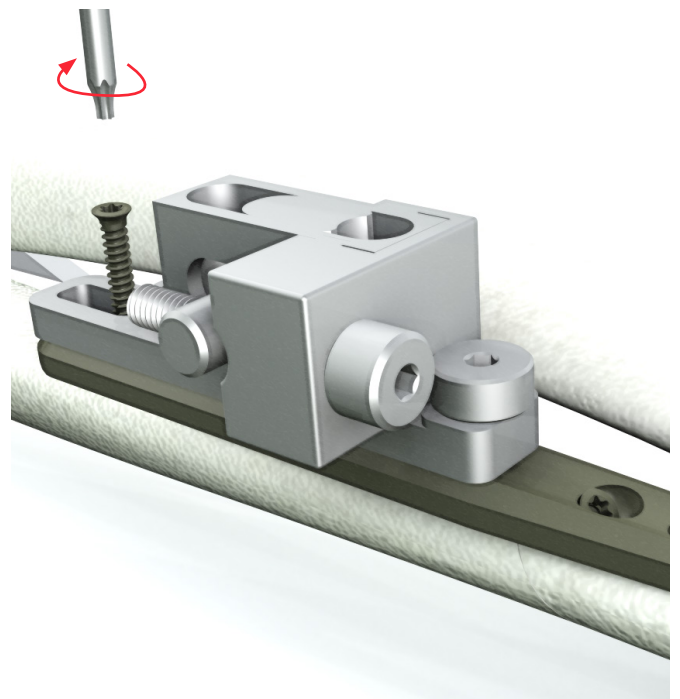
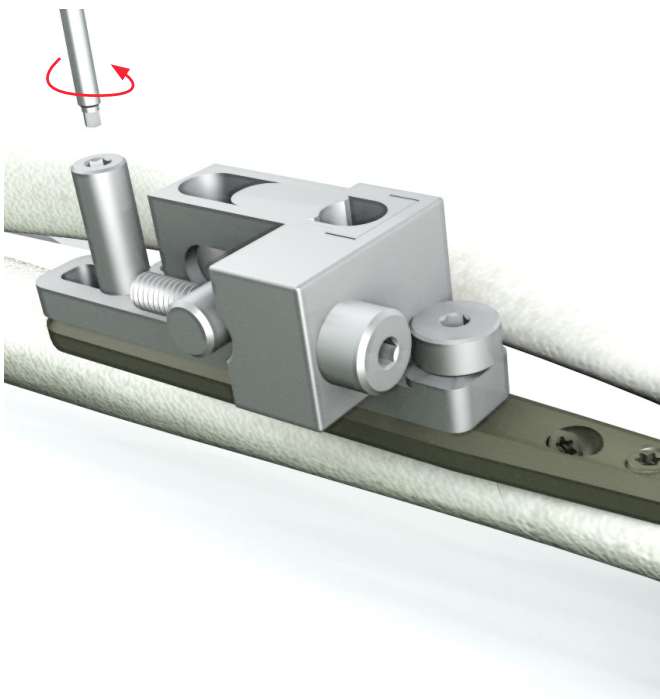
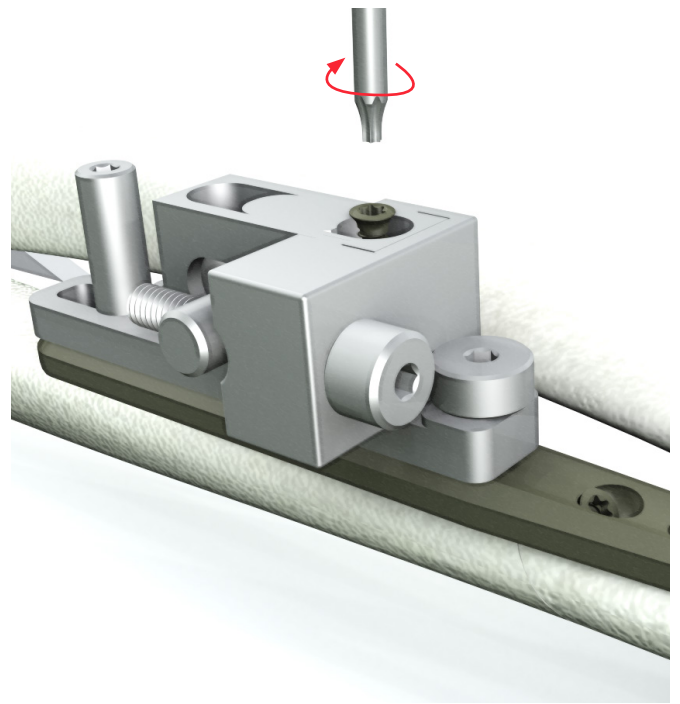
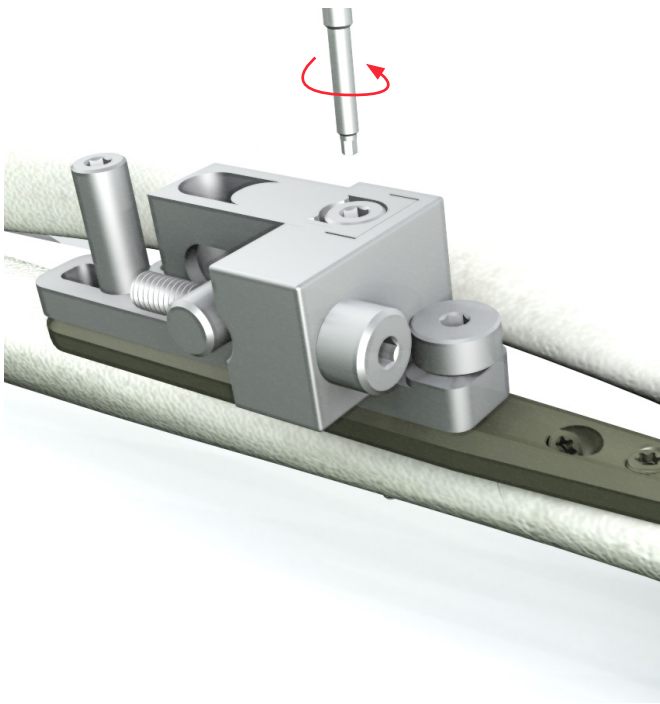
Shortening in mm	Displacement of the bores
0	
8	
9	
10	
11	
12	
13	

## ○ Placement of the screws

After making a hole with the spiral drill, D=2.0mm, L=100mm, AO Connector (**61203-100**), place a D=2.7mm cortical screw (**32271-XX**) as a fixation screw into the oblique hole. The cortical screw may also be used as a tension screw (bore into the near cortices of the plate using a spiral drill, D=2.7mm, L=100mm, AO Connector (**61243-100**)).

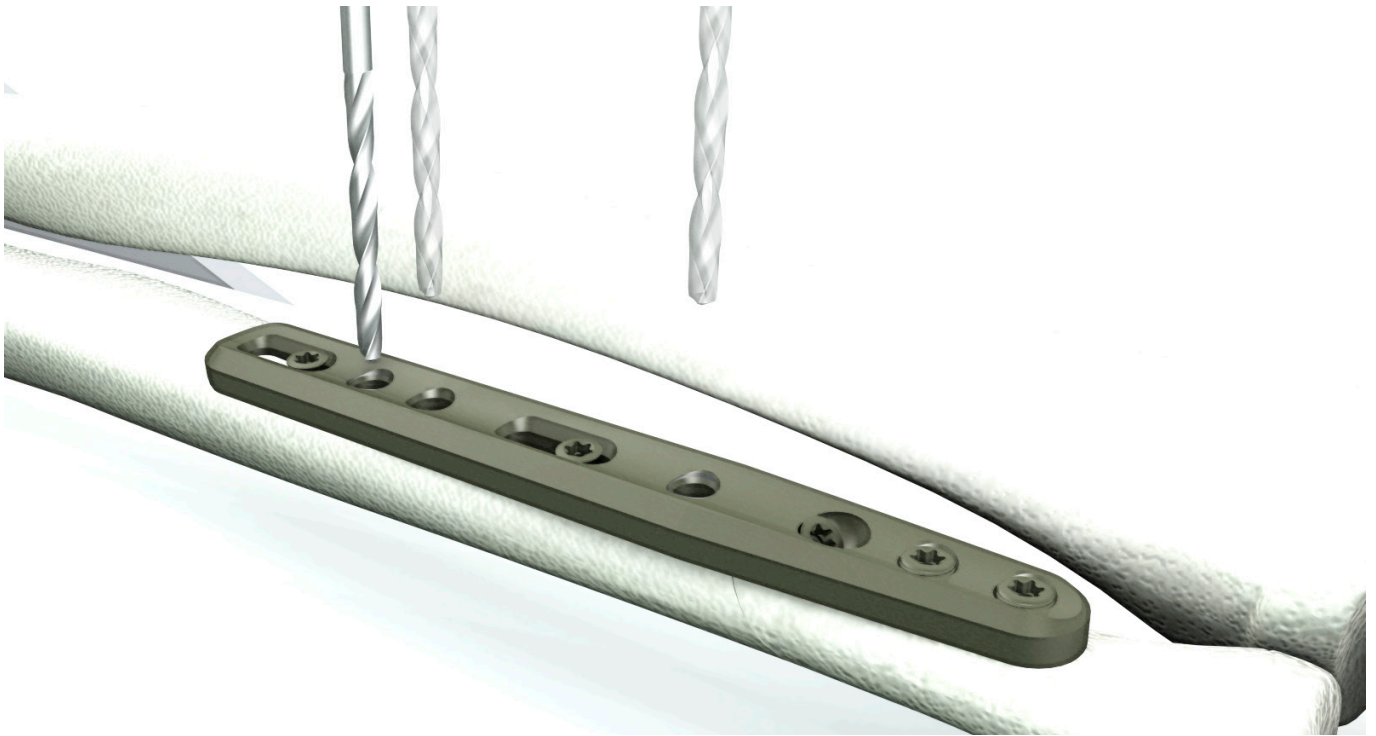


Loosen the pre-tension and replace first the tension bolt in the slide hole close to the osteotomy site, second the one at the end of the plate with a D=2.7mm cortical screw (32271-XX). Subtract 4 mm from the length measured.

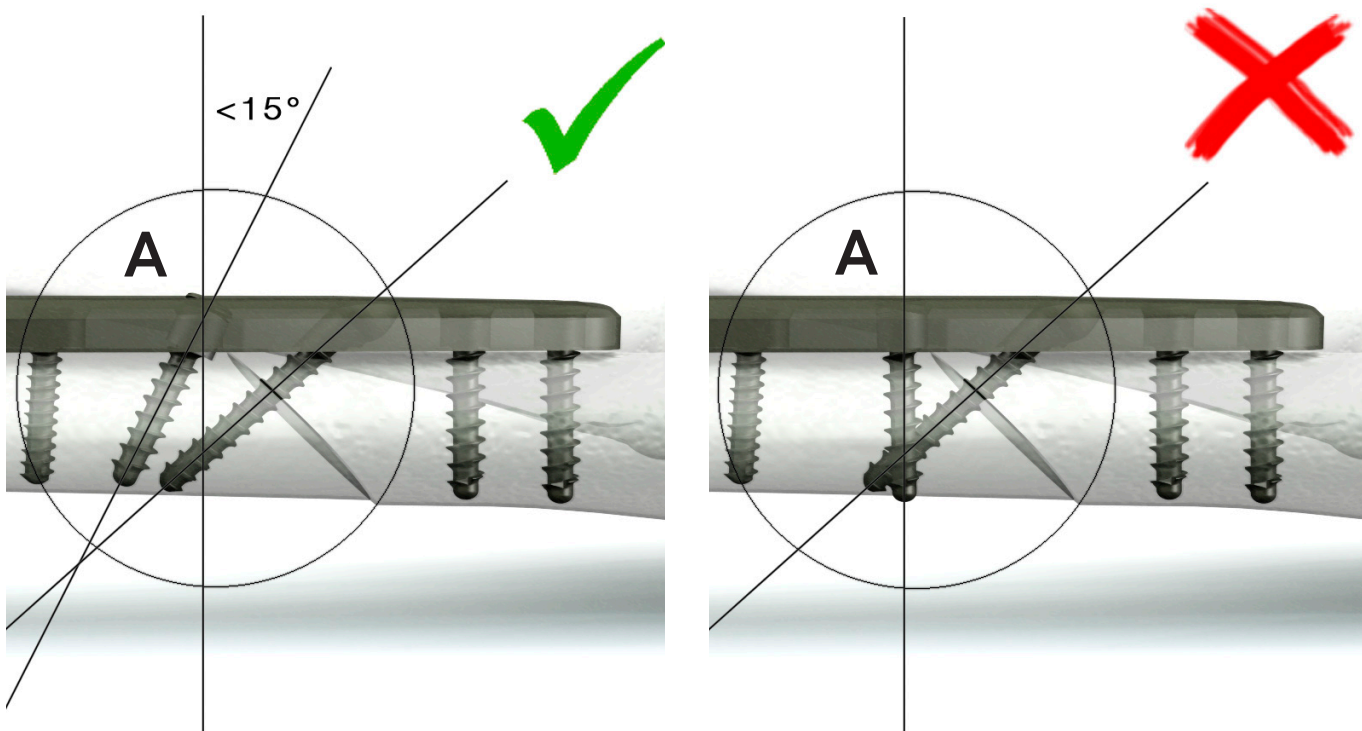


## ○ Removal of the instruments

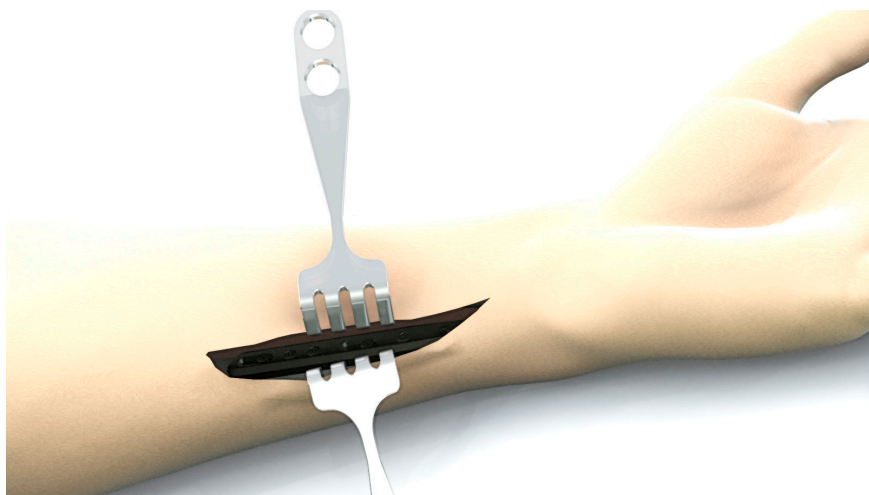
Remove the osteotomy system from the ulna osteotomy plate, and insert D=3.0mm locking cancellous screws (**37302-XX**) or D=3.0mm locking cortical screws (**37301-XX**) into the remaining plate holes. The drill diameter depends on the choice of the screws. (spiral drill, D=2.0mm, L=100mm, AO Connector (**61203-100**) for locking cancellous screw / spiral drill, D=2.4mm, L=100mm, AO Connector (**61243-100**) for locking cortical screw)



To avoid collision of the fixation/tension screw with screw **A** (see figure), it must be installed with an angle of up to 15° proximal. The direction of the drilled hole is to be selected so that the opposite cortices is not weakened. Monocortical installation with an angle-stable screw is possible.



The reduced periosteum should cover the osteotomy area. After verifying the rotation and radiologically controlling the osteotomy gap, plate position and screw length, suture the fascia and the skin. Drainage as required.



## ○ Postoperative treatment

Forearm splint for 3 weeks. Physical therapy aiming at freely closing the fist and bending/stretching of the elbow joint. During this period, rotation of the forearm should be restricted to R: 30/0/30. From the 5th postoperative week on, this is to be focused upon in accordance with the clinical and radiological follow-up examination results.

## ○ Explantation

If desired by the patient, the implant can be removed.

Removal should be performed at the earliest 1 1/2 years later or after radiographic verification of the healed bone.

The problem of cold welding was resolved by using a special surface treatment (for further information see page 27).

## ○ Summary

The Ulna Osteotomy Locking Plate provides a plate system (hybrid system) to be fixated with locking screws and compression screws, which is specially adapted to the anatomic and biomechanic requirements after a shortening osteotomy of the distal ulna. In a single device, the Ulna Osteotomy Locking Plate allows for unique coplanar orientation of the incisions with rotation-stable shortening and the option for compression.

The standardization of multiple surgical procedures into a single device system improves the quality of the surgical procedure.





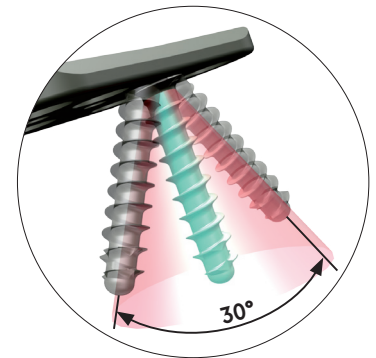
Information

3.

## ○ Locking

### Locking works because:

- ◆ Screw material (TiALV) is slightly harder than plate material (Titanium Grade 2)
- ◆ Screw head **forms** thread into the plate (no cutting)



### Benefits:

- ◆  $\pm 15^\circ$  and Locking
- ◆ No pre threading
- ◆ No cold welding
- ◆ No debris
- ◆ You can re-set the screw up to 3 times

## ○ Dotize<sup>®</sup>

### Chemical process - anodization in a strong alkaline solution\*

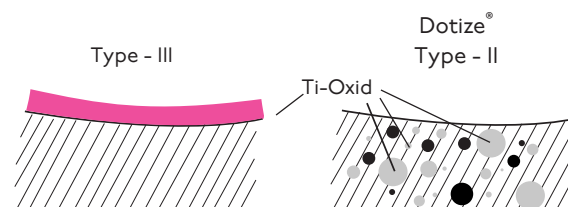
#### Type III anodization

- ◆ Layer thickness 60-200nm
- + Different colors
- Implant surface remains sensitive to:  
Chipping  
Peeling  
Discoloration

#### Dotize

#### Type II anodization


- ◆ Layer thickness 2000-10 000nm
- + Film becomes an interstitial part of the titanium
- No visible cosmetic effect











### Anodization Type II leads to following benefits\*

- ◆ Oxygen and silicon absorbing conversion layer
- ◆ Decrease in protein adsorption
- ◆ Closing of micro pores and micro cracks
- ◆ Reduced risk of inflammation and allergy
- ◆ Hardened titanium surface
- ◆ Reduced tendency of cold welding of titanium implants
- ◆ Increased fatigue resistance of implants
- ◆ Improved wear and friction characteristics

## Order list

Ulna Osteotomy Plate, 5-hole	21231-5		
Cancellous Screw, Locking, D=3.0mm, L=10mm	37302-10		
Cancellous Screw, Locking, D=3.0mm, L=12mm	37302-12		
Cancellous Screw, Locking, D=3.0mm, L=14mm	37302-14		
Cancellous Screw, Locking, D=3.0mm, L=16mm	37302-16		
Cancellous Screw, Locking, D=3.0mm, L=18mm	37302-18		
Cancellous Screw, Locking, D=3.0mm, L=20mm	37302-20		
Cancellous Screw, Locking, D=3.0mm, L=22mm	37302-22		
Cancellous Screw, Locking, D=3.0mm, L=24mm	37302-24		
Cortical Screw, D=2.7mm, L=10mm	32271-10		
Cortical Screw, D=2.7mm, L=12mm	32271-12		
Cortical Screw, D=2.7mm, L=14mm	32271-14		
Cortical Screw, D=2.7mm, L=16mm	32271-16		
Cortical Screw, D=2.7mm, L=18mm	32271-18		
Cortical Screw, D=2.7mm, L=20mm	32271-20		
Cortical Screw, D=2.7mm, L=22mm	32271-22		
Cortical Screw, D=2.7mm, L=24mm	32271-24		
Cortical Screw, D=2.7mm, L=26mm	32271-26		
Cortical Screw, Locking, D=3.0mm, L=8mm	37301-8		
Cortical Screw, Locking, D=3.0mm, L=10mm	37301-10		
Cortical Screw, Locking, D=3.0mm, L=12mm	37301-12		
Cortical Screw, Locking, D=3.0mm, L=14mm	37301-14		
Cortical Screw, Locking, D=3.0mm, L=16mm	37301-16		
Cortical Screw, Locking, D=3.0mm, L=18mm	37301-18		
Cortical Screw, Locking, D=3.0mm, L=20mm	37301-20		
Cortical Screw, Locking, D=3.0mm, L=22mm	37301-22		
Cortical Screw, Locking, D=3.0mm, L=24mm	37301-24		
Screwdriver, WS 2.5	56252		
Screwdriver, Torque, T9x70	56095-70		
Self-holding sleeve, Screwdriver, Torque 9	56095-70-2		
Depth Gauge, PROlock	59023		
Drill Guide, D=2.7/2.0mm	62202		
Drill Guide, D=2.0mm	62208		
Spiral Drill, D=2.0mm, L=100mm, AO Connector	61203-100		
Spiral Drill, D=2.4mm, L=100mm, AO Connector	61243-100		
Instruments, Ulna Osteotomy Plate			
Transection, Right, Ulna	680851-1		
Transection, Left, Ulna	680851-2		
Support for Transection Gauge Right	680852-1		
Support for Transection Gauge Left	680852-2		

Carrier Unit	680850	
Set-Screw Guide	680853	
Fixing Screw	680854	
Fixing Screw for Transection Gauge	680855	
Setscrew	680856	
Crossbolt	680857	
Slide	680858	
Tension Bolt	680859	
Sterilization Tray, Ulna Osteotomy Plate	50199	

For detailed cleaning and sterilization instructions, please refer to package insert.

## Tray







A series of horizontal red lines spanning the width of the page, providing a template for writing.



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